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Rate Constants of Gas Phase Reactions

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Rate Constants of Gas Phase Reactions
Reference Book

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ABSTRACT

This survey of the kinetics of bimolecular and termolecular reactions covers the literature to the end of 1969. Gas-phase reactions of neutral particles have been surveyed, rate constants are presented in consistent units and a number of reactions have been critically evaluated. A table of equilibrium constants has been added to the English edition as well as a bibliography of rate constant compilations and sources of evaluated kinetic information.

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FOREWORD TO THE ENGLISH EDITION

The gathering and evaluation of chemical kinetic information is not a new endeavor in science, but it is a weak link in the chain of information from research worker to practitioner. The past decade has produced a wealth of kinetic information of great potential usefulness in science, technology and engineering, much of which has yet to be applied. The synthesis of such widely scattered items of information into a conveniently usable form is best accomplished by a specialist of wide experience; an onerous task which can be done only at the expense of one's personal research interests. Therefore, chemical kinetics is fortunate that such an eminent specialist as Professor Kondratiev has undertaken this important task.

Professor Kondratiev has made an exhaustive search of the literature and compiled reaction rate data in consistent units. Where possible he has made a critical evaluation of the data to derive best estimates of Arrhenius parameters. He deserves the thanks of the scientific community for this public service.

We in the Fire Science Problems Group at the Applied Physics Laboratory, The Johns Hopkins University, have been keenly aware of these problems. The objective of our program, which is supported by the RANN Division of the National Science Foundation (Research Applied to National Needs), is to gather scientific and engineering information relevant to fire problems and to make it available in a usable form that is also suitable for teaching purposes. Since chemical kinetics is one important aspect of fire research, Dr. Ronald Walker of this laboratory suggested that we perform a service to the scientific and engineering community by making Professor Kondratiev's compilation available in an English translation. Mr. Lester Holtschlag of the APL Technical Information Division agreed to undertake the translation and serve as co-editor; he has carried the major burden of the project. Technical editing and supervision were undertaken by Dr. Robert M. Fristrom of the APL.

At the outset of the project we contacted the Office of Standard Reference Data (OSRD) at the National Bureau of Standards which administers the National Standard Reference Data System (NSRDS). We spoke with Dr. D.R. Lide, Jr., Chief of the Office, Dr. L.H. Gevantman, Program Manager for Chemical Kinetics and Dr. D. Garvin, Chief of the Chemical Kinetics Information Center at NBS. They welcomed our effort as a useful addition to their program in the compilation, evaluation and publication of chemical kinetic data. They offered to arrange for the publication and dissemination of this document as part of the OSRD data series. This offer will be of great value in making the work available to the scientific community.

The editors decided that the utility of the compilation would be increased by the addition of thermodynamic equilibrium constant information which allows the derivation of the rates of the reverse reactions. These were calculated from data taken from the JANNAF Thermochemical Tables using a program available at the APL. In addition a supplementary bibliographic list of other compilations and sources of evaluated chemical kinetic information has been added.

A number of people have contributed to the preparation of this reference work. In order to take advantage of the original tabulation, equivalent English

call-outs were superimposed on the original Russian, a meticulous task which was started by Mrs. Helen Redmiles and brought to completion by Miss Sally Bumgarner. During this process some of the original typographical errors were eliminated. Miss Sally Bumgarner also typed the major portion of the translation, with assistance from Mrs. Evelyn Smith. Mrs. Nell Blake typed the equations in the "Equilibrium Constants" section. Mr. Michael Robison proofread the final manuscript, as did the two editors. Mr. Stanley Favin programmed the thermodynamic calculations of the equilibrium constants. Professor Robert F. Sawyer of the University of California made a number of constructive suggestions in connection with this table and the manuscript.

Professor Kondratiev was most cooperative and graciously furnished an errata sheet to the Russian edition which has been incorporated in the present edition. We wish to express our thanks and appreciation to Professor Kondratiev for all who will benefit from his labors.

Despite the best efforts of those concerned with this publication, it would be surprising if errors were completely absent. The editors would appreciate receiving notice of such oversights, so that corrections can be made available for future compilers.

L. J. Holtschlag

R. M. Fristrom

FOREWORD

Data on the rate constants of chemical reactions are appearing in the chemical literature in an ever increasing volume. Hundreds and thousands of data items relating to the most varied reactions have accumulated to date. From time to time attempts are made to compile summaries of all the known data for individual classes of reactions. As a rule, all these summaries amount to a simple compilation of data taken from various sources; only in very rare cases is an evaluation of the reliability of these data made.

Tables of properly estimated rate constants are required for the following classes of reactions:

1. Gas-phase reactions of neutral particles,
2. Ion-molecular reactions in the gas phase,
3. Homolytic liquid-phase reactions,
4. Heterolytic reactions,
5. Topochemical reactions (reactions in solids),
6. Electrochemical reactions.

Handbooks on the first (except for monomolecular and isomerization reactions) and third classes of reactions have been prepared in the Chemical Physics Institute of the Academy of Sciences of the USSR, and work is proceeding in the compilation of handbooks on the other classes of reactions (except for electrochemical reactions). The present handbook refers to the first class of reactions.

Two years ago the author of this handbook made an attempt to collect, in the form of tables, the available literature data on the rate constants of elementary chemical reactions in the gas phase. The author was aware, of course, of all the difficulties inherent in collecting and critically evaluating the kinetic constants, but nevertheless decided to carry the work through, although only in the first approximation. The result is the compilation of the present tables, which cover a large part of the investigated gas-phase reactions, excluding reactions of monomolecular decomposition of complex molecules and isomerization reactions. The tables presented in this handbook include exchange reactions of atoms and radicals, addition and recombination reactions, radical decomposition reactions, and also reactions of saturated molecules and electronically excited particles.

The handbook was put together primarily on the basis of original work published in various scientific journals. In preparing the handbook account was also taken of survey articles and of tables published in such journals as "Chemical Reviews", in collections such as "Progress in Reaction Kinetics" et alia, as well as in the monographs of Schumacher, Kassel, Trotman-Dickenson, Benson et al. A large portion of the data published up to 1969 has gone into the handbook.

Critical evaluation of the kinetic constants involves difficulties of both objective and subjective nature. The objective difficulties specific to kinetic constants stem primarily from the nature of the tabulated material, which

in contrast to thermochemical and thermodynamic data and data from a number of other branches of science and technology, characterizes a substance not in the statics sense, but in the dynamics sense, being essentially not a characteristic of the substance, but of the process. Here is revealed in a particularly distinct manner the difficulty arising from the fact that the theory of a chemical process, in contrast to the theory of structure, is still in the initial stage of development and only in rare instances can yield sufficiently well-founded data which will permit correct estimation of a given rate constant, in particular, correct determination of the temperature-dependence of a constant. A striking illustration of the difficulties inherent in the inadequate development of the theory is the problem of the fulfillment of Arrhenius' law in a broad temperature interval. The problem of the temperature-dependence of a rate constant is intimately bound up with the problem of energy exchange in the activation collision of molecules, a problem which has also not been deeply investigated. Elaboration of the theory of energy exchange is therefore one of the prerequisites for the solution of the theoretical problem of the temperature-dependence of a rate constant.

Furthermore, one of the objective difficulties is, in many cases, insufficient information on the reaction mechanism, as well as the presence of side reactions, which are difficult to take into account. Quite frequently it is necessary to consider heterogeneous reactions taking place in parallel with the basic homogeneous reaction. It is possible to cite many examples of how inadequate insight into the reaction mechanism has led to errors in determining the rate constants of chemical reactions. Exact knowledge of the reaction mechanism is one of the necessary conditions for reliable determination of these constants.

Severe difficulties also arise in determining the rate constants of interaction of atoms and radicals with various molecules when these active particles are produced in an electrical discharge or by photochemical means: usually formed along with them are other active particles, which distort the reaction kinetics and thus affect the accuracy of rate-constant determination. One such difficulty is, in particular, the generation of hot particles, i.e., of particles having surplus energy considerably exceeding their mean thermal energy. This excess energy makes the hot particle more reactive than particles whose energy corresponds to the reaction-zone temperature. Hence, it is clear that reliable rate-constant values can be obtained in this case only if measures are taken which will lead to thermalization of the hot particles.

Finally, among the difficulties which must be classified as of both objective and subjective nature are those associated with inadequate cleansing of the reagents of impurities which alter the reaction kinetics. Here, too, we know of a large number of examples illustrating how insufficient attention to reagent purity has led to erroneous reaction-rate values.

Insofar as difficulties of a purely subjective nature are concerned, here it is necessary above all to point out that very often the information on reaction conditions published in original articles proves to be inadequate for a critical evaluation of the measurement results and for comparison of the results of a given paper with those of other papers. In particular, instances are not rare in which the authors do not indicate the temperature at which measurements were made. For example, the experimental temperature in the case of pulsed photolysis is far from being always given. Moreover, as a result of the recom-

bination of active particles at the high particle concentration typical of such experiments, the temperature may be considerably greater (by tens of degrees) than room temperature.

In addition, in measuring the rate constants of monomolecular reactions or of addition and recombination reactions, the temperature range in which the measurements were carried out is by no means always indicated. For this reason it is frequently impossible to judge whether a given reaction is taking place in the high-pressure region (first-order monomolecular reaction or second-order addition reaction) or in the low-pressure region (second and third-order reactions).

From all that has been said above it follows that the measured rate constant and the formula established on this basis can be considered sufficiently reliable only if very thorough account is taken of all possible experimental errors and if an evaluation is made of the validity of all the assumptions. Unfortunately, this is not nearly always done, as is evident from the many instances of appreciable discrepancy between the rate-constant values measured by different authors, often greatly exceeding the range of the errors ascribed by the authors to their measurements. In choosing the most reliable rate-constant values, therefore, it is usually necessary to follow, wherever possible, theoretical considerations (even though the theory of elementary chemical reactions is still far from perfect and is incomplete, as indicated above), that is, considerations based on errors that are probable or possible under given experimental conditions or when a certain method is used, or simply considerations of a statistical nature.

The least-squares method is normally used to find the most probable Arrhenius formula for the rate constant on the basis of data obtained at various temperatures (assuming that these data have identical weight). Without doubt, this method is more accurate than, e.g., the frequently used averaging method, in which the arithmetic mean of the logarithms of the pre-exponential factor of all the measurements (all with the same weight) is chosen as the logarithm of the pre-exponential factor, and the arithmetic mean of all the measured values of the activation energy is chosen as the activation energy proper.

With regard to the weight of the individual measurements, since an objective and fully reliable determination of each particular measurement is practically impossible, when examining a large number of data, all data not greatly different from each other are usually assigned the same weight, namely 1, while all the other data are assigned the weight 0, i.e., they are simply disregarded.

The reliability of some methods used to find the rate constant frequently arouses serious doubts, forcing us to assign zero weight to the data found by them. For instance, it is often necessary to cast doubt on the results of rate-constant measurements under complex flame conditions. Such complexity is due to the presence of a number of competing active particles in the flame zone, and as a result different kinds of assumptions, sometimes ill-founded, must be made in determining the rate constant of this specific reaction.

Considerable doubt must also be placed on data obtained as a result of calculating some macroscopic measured quantity (induction period, temperature profile of a flame or of a detonation wave, etc.) by means of computers. A rather

cumbersome system of kinetic equations is sometimes the basis of such calculations, and the rate constants of the reactions contained in the system are chosen such that the desired macroscopic quantities are described quantitatively in the best manner. The distinct ambiguity of this method of finding the most probable rate constants detracts from its reliability and explains why constants obtained in this fashion are often completely unacceptable.

From all the material collected on chemical gas-phase reactions it can be concluded that even though adequately reliable and exact rate-constant values are available for a certain, now rather large, number of reactions, an even larger number of reactions are characterized by unreliable constants that must be remeasured for an exact determination, or do not have quantitative characteristics at all.

In preparing this handbook the author received invaluable technical assistance from V. D. Grammatchikova, and also from T. M. Litvinenko, S. S. Polyak and L. Yu. Rusin. A certain small portion of the material was collected by V. V. Azatyan. The author expresses his deep gratitude to all these colleagues.

I also wish to thank Dr. G. Huybrechts (Belgium), who sent us the kinetic data obtained in Prof. P. Goldfinger's laboratory, and Prof. W. Jost (Fed. Rep. Germ.), who submitted data from his laboratory.

V. N. Kondrat'ev

INTRODUCTION

The rate-constant tables for the various particles (see the table of contents) published in this handbook are set up as follows. The reaction is given in the first table, the temperature or temperature range in which the rate constant of the given reaction was measured (denoted in what follows by k) in the second, the common logarithm of the constant pre-exponential factor A, expressed in terms of k,

$$k = AT^n \exp\left(-\frac{E}{RT}\right),$$

in the fourth, the number n in the fifth, the activation energy E in kcal/mole in the sixth, the method of studying the reaction or of obtaining the given atom or radical (see below) in the seventh, references to the literature sources in the eighth, and remarks in the ninth. The rate constants of first-order reactions are given in sec^{-1}, of second-order reactions in $cm^3 mole^{-1} sec^{-1}$ and of third-order reactions in $cm^6 mole^{-2} sec^{-1}$.

In the case of monomolecular reactions, when they are of the first order (high pressures), the reaction is represented by the equation

$$AB = A + B,$$

and when they are of the second order (low pressures) by the equation

$$AB + M = A + B + M.$$

In those cases when the order of the reaction is not established or when it is known that it is intermediate between the first and the second, the monomolecular reaction is represented by the formula

$$AB \rightarrow A + B.$$

The addition or recombination reactions are represented in exactly the same way by the equation

$$A + B = AB$$

when these reactions are of the second order, by the equation

$$A + B = AB + M$$

in the case of a third order reaction, and by the formula

$$A + B \rightarrow AB$$

if the order of the reaction is unknown or intermediate.

Exchange reactions are represented by the equation

$$A + BC = AB + C \text{ or } AB + CD = AC + BD.$$

As regards the methods by which the reactions were studied, the reaction conditions, e.g. thermal ("therm."), photochemical ("photochem."), radiation-chem ("rad.-chem.") etc., including pulsed photolysis and pulsed radiolysis, are indicated in the appropriate column, as a rule. "Pyr.", "photol.", and "radiol." denote, respectively, pyrolysis, photolysis and radiolysis. "Photo-Cl_2" denotes photochlorination, "photo-ox.", photooxidation. "Fl.", "rare. fl." or "diff. fl.", "atom. fl." denote flame reactions: highly rarefied, diffusion or atomic; "shock" denotes shock-wave reactions.

"Flow" and "stat." denote the jet or static methods of reaction; "hom. react." denotes reaction in a homogeneous reactor; "cr. beams" denotes reaction in crossed beams. "Calc." means that k is calculated theoretically; "est." means that k was found on the basis of general considerations and indirect data.

"Dis.", "m.-w. dis.", "cond dis." and "pulse dis." indicate that the corresponding active particles were obtained in an electric discharge, microwave discharge, condensed discharge and pulsed discharge, respectively (in the case of nitrogen atoms, "act. N_2" is often used instead of "dis."). "Hg photo." means the active particles were obtained photochemically using Hg as the sensitizer; "photo-ex." indicates photo-excitation; "int. ill." is intermittent illumination; "rot. sect." is the rotating sector method. $N + NO = N_2 + O$ means that the oxygen atoms were obtained by this reaction, the nitrogen atoms being obtained from discharge in nitrogen; "NO_2 tit." denotes titration of oxygen atoms by the reaction $O + NO_2 = O_2 + NO$. "W" denotes that hydrogen atoms were obtained from an incandescent tungsten wire.

"Spect.", "mass-spect." and "EPR" indicate the detection or measurement of concentrations by spectroscopy, mass spectroscopy and from the EPR spectrum, respectively; $p \rightarrow O$ means the para-ortho conversion of hydrogen.

The ignition limits ("ignit. lim."), in particular, the lower limit ("low lim."), inhibition ("inhib.") or the thermal limit ("therm. lim.") denote the corresponding methods of measuring k; the diffusion cloud method, "diff. cl."; "comp.", determination of k by means of a computer. "From k_- and K" means the determination of k by the formula $k = Kk_-$, where k_- is the rate constant of the inverse reaction and K is the equilibrium constant.

The temperature is given almost everywhere in degrees Kelvin; only in rare cases (in a number of remarks) is it given in degrees Celsius. In the latter case the temperature is written as $T^{\circ}C$.

Δ is the generally accepted symbol for the ratio of the k of the disproportionation reaction to that of the recombination reaction; φ is the ratio of the k of recombination of the $R_1 + R_2$ radicals to the square root of the product of the recombination rate constant of the $R_1 + R_1$ and $R_2 + R_2$ radicals. The recombination rate constant is often denoted as k_p.

The prime denotes electronically-excited particles; the star denotes unstabilized particles (in particular, particles formed in addition reactions).

In some cases the thermal effect of the reaction is given (in kcal/mole). The figures are taken from the handbook of V. I. Vedeneev, et al. "Chemical Bond Rupture Energy. Ionization Potential and Electron Affinity," Publ. House of the Acad. Sci. USSR, Moscow (1962).

In a number of cases an attempt was made by the author to find the most probable value of k or the most probable formula for k. As a rule, in those cases when the measured values of k differ from each other by a factor no greater than ½ and when there is no reason to assign either weight (1 or 0) to the individual data, the formula for k was calculated from these data by the least-squares method. The calculation was made using the measurement data obtained at a certain temperature as well as data calculated by the formulas given by the authors for the extreme temperatures of the temperature interval they studied. (A dash is placed in the appropriate rows under the "literature" column; the literature is cited in the remarks.) In a number of cases the formula obtained in this manner for k is evaluated as the most likely and is used as the standard formula for obtaining other formulas from it. The formulas chosen as standards and the formulas accepted as reliable for some reason or other are denoted by the letter R (in the last column of the tables), denoting the formula which can be recommended as the most reliable.

It is probable that such an evaluation could be given to a considerably greater number of formulas. But the author considers it more proper that such an evaluation be made by people directly concerned with measurements of the corresponding rate constants, and therefore more informed as to the conditions under which these measurements were made and as to all the possible error sources.

The tabulated expressions for k of a number of atom and radical reactions with hydrocarbons over a wide temperature range usually do not allow for the fact that, in reality, the measured constant represents the sum of constants for detachment of H atoms from various positions in the hydrocarbon molecule. Within a moderate temperature range, however, $k = \Sigma\, k_1$ is fairly well described by the simple Arrhenius formula.

ATOM REACTIONS

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + H_2 = H_2 + H$	283-373	-	14.32	0	7.75	dis. ,H_2	[613]	1,2,1668
	"	-	12.88	0	6.0	"	"	
	"	-	13.73	0	7.25	"	[613,526]	
	291	7.88	-	-	-	Hg photo.	[1104]	
	300-444	-	15.07+lg Γ	-1/2	9.21	W	[1318,1381]	3
	723-1023	-	13.96	0	6.86	therm.	[1540]	4,5
	753	12.04	-	-	-	"	[1338]	
	873-1023	-	13.91	0	6.61	"	[516,515, 519]	5
	1000	11.70	-	-	-	-	[995]	
	283-1023	-	12.06	1/2	5.5	-	[1712]	6
	"	-	13.7	0	7.5±1	-	[1524]	7
	"	-	14.06	0	8.0±0.5	-	[1592]	"
	280-1020	-	13.66	0	6.86	-	-	8
$H + HD = H_2 + D - 0.8$	700-1000	-	13.39_5	0	7.14	therm.	[1540]	4,9,10
	900	11.72_6	-	-	-	"	"	
	1000	11.89	-	-	-	"	"	
	"	11.98	-	-	-	"	[519]	
	"	11.57	-	-	-	"	[187]	5
$H + DH = HD + H$	700-1000	-	13.33	0	6.53	therm.	[1540]	4, 11
	1000	11.83	-	-	-	"	[519]	
$H + D_2 = HD + D - 1.0$	368-468	-	12.64	0	7.30±0.1	W	[1380]	12, 13, 14
	450-750	-	13.66±0.13	0	9.39±0.30	dis. , flow , EPR	[1585]	
	700-1000	-	13.65_3	0	7.36	therm.	[1540]	4
	850-1000	-	-	0	6.55	"	[519]	
	1000	12.08	-	-	-	"	"	15
	"	11.78_4	-	-	-	"	[187]	5
	1200-1700	-	13.7	0	7.5	"	[152]	
	283-1023	-	12.00	1/2	6.5	-	[1712]	6
	368-1000	-	13.49±0.20	0	8.91±0.50	-	-	16
$H + O_2 = OH + O -$ $- 16.6\pm0.3$	600-850	-	12.41	1/2	18.0	fl.	[1745]	17
	733-873	-	14.04	0	16.0	low lim.	[1735]	
	758	9.83	-	-	-	fl.	[1387]	
	773-823	-	13.62	0	15.2	low lim.	[78]	
	773-873	-	13.86	0	15.7	fl.	[1757]	
	793	9.43	-	-	-	low lim.	[78]	
	"	9.70	-	-	-	fl.	[1387]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	800 - 1000	-	$14.21_5 \pm 0.10_5$	0	16.2±0.4	low lim.	[973,974]	18
	803 - 933	-	14.01	0	16.3	ignit. lim.	[1698]	
	813	9.78	-	-	-	est.	[87]	
	840 - 930	-	13.89	0	15.9±0.8	ignit. lim.	[1700,1699]	
	843 - 913	-	13.92	0	16.0	"	[1756]	19
	858 - 933	-	14.01	0	16.4	"	[1758]	
	863 - 923	-	14.14±0.18	0	17.6±0.6	"	[1703]	
	873 - 923	-	13.53±0.15	0	15.5±0.6	"	"	
	890 - 1350	-	-	0	18.9±0.9	shock	[1126]	
	900 - 1052	-	14.01±0.05	0	16.6±1.2	fl.	[1707]	
	900 - 2000	-	-	0	16.5	shock	[1440]	
	915	10.20	-	-	-	fl.	[469]	
	960 - 1080	-	15.00	0	17.75	comp.	[1408]	20
	975 - 2060	-	13.98	0	14.7	shock	[699]	21
	1100	11.17_5	-	-	-	fl.	[534]	
	1100 - 1500	-	14.78	0	18±3	"	[534,531]	
	1290 - 1667	-	13.89	0	14.45	shock	[700]	22
	1400 - 2500	-	14.9	0	17.6	comp.	[1326]	
	1400 - 3000	-	14.3	0	16.7	shock	[247]	
	1650	12.15_5	-	-	-	"	[1378]	23
	1700 - 2700	-	12.78	1/2	17.75	shock	[1173]	
	293 - 1500	-	14.33±0.30	0	16.6±0.8	-	[81]	24
	"	-	12.62	1/2	15.9	-	"	"
	293 - 1650	-	14.31±0.28	0	16.5±0.7	-	[93,91]	25
	295 - 1575	-	14.34	0	16.5	-	[1590]	26
	310 - 2060	-	14.19±0.07	0	16.73±0.25	-	-	27,28, R
$H + O_3 = OH + O_2 +$ $+ 77.5 \pm 0.8$	300	13.20±0.08	-	-	-	dis. , flow	[1243]	
	"	>12.4	-	-	-	atom. fl.	[607]	29
$H + O_2 + H_2 = H_2O +$ $+ OH'(^2\Sigma^+) + 11.1$	1100 - 1900	11.30	-	-	-	shock	[137]	30
$H + OH = H_2 + O -$ $- 1.9 \pm 0.3$	300	9.54	-	-	-	-	[1628]	
	300 - 2000	-	12.76±1.0	0	5.8±1.5	from k_ and K	[895]	31
	410 - 730	-	12.72	0	7.5	"	[1491]	
	960 - 1080	-	12.74	0	7.37	comp.	[1408]	32
	370 - 1670	-	13.03	0	7.97	from k_ and K	-	33
$H + H_2O = H_2 + OH -$ $- 14.7 \pm 0.3$	300 - 2000	-	14.48±1.0	0	21.1±1.5	from k_ and K	[895]	
	960 - 1080	-	14.84	0	21.62	comp.	[1408]	34

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	1000 - 1130	-	13.57±0.25	0	19.9±0.6	fl.	[115]	35
	1285 - 1500	-	15.0	0	25.5	"	[531,537]	
	300 - 2200	-	14.03	0	20.43	-	-	33
$H + D_2O = HD + OD -$ $- 16.0 \pm 0.3$	1072	< 9.7	-	-	-	fl.	[472,468]	
	"	9.556	-	-	-	"	[472,471,469]	
	"	-	13.93	0	21.8	-	[471]	36
$H + D_2O = HDO + D -$ $- 1.8 \pm 0.6$	288 - 457	-	-	0	11	dis.	[616,615]	37
$H + HO_2 = 2\ OH + 37.8 \pm 2$	room	14.86	-	-	-	Hg photo.	[264]	
	300	>12.78	-	-	-	dis., flow	[565,892]	
	773	13.85	-	-	-	comp.	[91]	38
	300 - 773	-	14.23	0	2.0	-	-	39
$H + HO_2 = H_2 + O_2 +$ $+ 56.3 \pm 3.3$	293±3	-	-	-	-	mass spect.	[1726,1723]	40
	300	≥11.3	-	-	-	dis., flow	[565,892]	
$H + H_2O_2 = H_2 + HO_2 +$ $+ 16 \pm 2$	743 - 803	-	14.62	0	11.8±2	comp.	[91]	41
	960 - 1080	-	16.39	0	18.22	"	[1408]	42
$H + H_2O_2 = H_2O + OH +$ $+ 68.4 \pm 0.4$	room	<10.78	-	-	-	dis.	[565]	
	743 - 803	-	14.62	0	9±2	comp.	[91]	43, 41
$H + H_2S = H_2 + HS +$ $+ 12.6$	room	-	-	-	-	photol.	[969]	44
	297	-	-	-	-	"	[969]	45
	300 - 478	-	-	-	-	photol. H_2S	[436]	46
	323 - 425	-	-	0	2.7	photol.	[1562a]	
	-	-	-	-	3.0±0.2	-	[1562,435]	
$H + F_2 = HF + F +$ $+ 96.6 \pm 0.9$	-	-	13.48	0	4.2	calc.	[1228,1287]	47
	-	-	12.72	1/2	4.0	est.	[1287]	48
	-	-	12.82	0	1.5	est.	[1287]	
	-	-	12.72_3	1/2	4.0	"	"	
	288	12.25	-	0	1.5±0.3	photochem.	[1003]	49
	294-565	-	14.06	0	2.45±0.15	mass spect.	[1723]	
	"	-	14.08±0.05	0	2.4±0.2	dis., flow	[1724]	50

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + Cl_2 = HCl + Cl +$	196-296	-	-	-	-	rad.-chem.	[438]	52
$+ 45.1$	273-335	-	12.36±0.3	1/2	1.41±0.43	photochem.	[944]	53
	"	-	14.47_7	0	3.0	-	[43,944,1491]	54
	"	-	-	-	-	-	[829]	55
	294-557	-	14.50	0	1.73±0.15	mass spect.	[1723]	
	"	-	14.57±0.04	0	1.8±0.3	dis., flow	[1724]	
	298	12.05	-	-	-	photochem.	[167]	56
	298-373	-	-	0	1.0±0.5	-	-	57
	300-1100	-	15.10	0	2.2	calc.	[1010]	
	-	-	12.94_4	0.68	2.7	est.	[1287]	
	-	-	12.64_3	0.68	2.7	"	"	
	196-335	-	14.25±0.25	0	2.01±0.35	-	-	58
$H + Br_2 = HBr + Br +$	273-575	-	-	0	1.0	therm.	[1148]	59
$+ 41.3$	303-575	-	-	-	-	"	[196]	60
	303-575	-	12.81	1/2	1.1	therm.	[198, 305]	61
	"	-	12.83	1/2	0.9	-	[200,196,1712]	R
	1300-1700	-	-	-	-	shock	[233]	
	~1400	-	-	-	-	"	[235]	62
$H + I_2 = HI + I + 34.84$	303-533	-	-	-	-	photol. HI	[1229]	68
	326-473	-	-	-	-	"	[795]	69
	375-462	-	12.59±0.11	1/2	0±0.25	photochem.	[1616]	63
	387-471	-	-	-	-	photol.	[1383]	64
	633-738	-	13.0±0.2	1/2	0±0.5	therm.	[1446]	65
	667-800	-	-	0	0	"	[1449]	66
$H + FCl = HF + Cl +$	-	-	12.25_4	0.68	3.2	est.	[1287]	
$+ 76.1±0.5$	-	-	11.7	1/2	3.0	"	"	
$H + ClF = HCl + F +$	-	-	12.74_8	0.68	1.9	est.	[1287]	
$+ 43.2±0.2$	-	-	11.7	1/2	3.0	"	"	
$H + HF = H_2 + F -$	3700-6100	-	12.3	0	35.0	shock, est.	[184]	
$- 31.8±0.3$	3800-5300	-	13.0	0	35.0	shock	[828]	67

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + HCl = H_2 + Cl + 1.1$	195-373	-	11.5±0.2	1/2	2.9±0.3	dis. , flow	[379]	
	195-497	-	13.34±0.14	0	3.5±0.2	dis. , flow	[1588]	
	901-1071	-	13.4	0	5.2	therm.	[1436]	
	"	-	13.857	0	5.2	"	[1436, 554]	70
	298-1000	-	13.6	0	4.5	from k_ and K	[43]	
	"	-	12.4	1/2	4.0	"	[43, 1712]	
	-	-	11.16	-1/2	4.0	-	[1287]	
	-	-	11.91_3	0.68	4.7	est.	"	
	195-1000	-	11.71±0.28	1/2	3.1±0.4	-	[379, 547]	71
	195-1070	-	13.47±0.15	0	3.70±0.23	-	-	72
$H + DCl = HCl + D$	900	12.11_4	-	-	-	therm.	[1436]	
$H + HBr = H_2 + Br +$	303-575	-	11.884	1/2	1.109	therm.	[198, 305]	73, R
$+ 16.6±0.1$	463	-	-	0	$\angle$ 3	dis. ,p → 0	[410]	
	821-984	13.36	-	0	-0.9±1.8	therm.	[1434]	74
	970-1300	-	13.79	0	2.19	comp.	[1409]	75
$H + HI = H_2 + I +$	633-738	-	12.20±0.2	1/2	0.48±0.35	therm.	[1446]	
$+ 32.85±0.10$	667-800	-	12.05±0.07	1/2	0 ±0.25	from k_ and K	[1449]	R
	973	13.52	-	-	-	therm.	[799]	76
$H + ClO = OH + Cl +$ $+ 38.0±0.3$	-	-	12.88	0.68	4.8	est.	[1287]	
$H + ClO = HCl + O +$ $+ 38.9$	-	-	12.77	0.67	1.3	est.	[1287]	
$H + Cl_2O = HOCl + Cl +$ $+ 63±10$	room?	13.11±0.07	-	-	-	dis. , flow	[586]	77
$H + CO_2 = OH + CO -$	300 - 1275	-	16.30	-0.766	25.11	from k_ and K	[1290]	78
$- 24.3_5±0.3$	1000 - 1200	-	-	-	-	fl.	[532,533]	79
	1000 - 4000	-	13.74_8	0	23.5	-	[771]	80
	1072	8.92	-	-	-	fl.	[469,471]	81
	1073 - 1323	-	12.8	0	25.9	therm.	[1505]	82
	1217 - 1345	-	15.477	0	33.3	fl.	[532]	83
	-	-	13.42_6	1/2	33.0	-	[349,1289]	
	300-1700	-	14.07	0	25.18	from k_and K	-	47, R
$H + CO_2 = O + HCO -$ $- 95.4$	-	-	12.41_5	1/2	98.70	calc.	[1290]	
$H + NH_3 = H_2 + NH_2 -$	423	~7	-	-	10 - 15	dis. flow	[1364]	
$- 0.7±2$	680 - 780	-	-	0	11±1	therm.	[518]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	843 - 963	-	13.61±0.12	0	13.7±0.6	inhib.	[1752]	
$H + N_2H_4 = H_2 + N_2H_3 +$ $+ (28.2±5)$	298 - 440	-	11.54_3	0	2.0	dis., flow	[1364]	
$H + N_2H_4 = NH_3 + NH_2 +$ $+ 44±5$	296 - 478	-	~13.0	0	~7	Hg photo. p → 0	[170]	84
$H + N_2H_4 = NH_3 + NH_2'$	293 - 349	-	8.08	0	2.6	dis., flow	[622,1364]	
$H + PD_3 = PD_2H + D$	763 - 893	-	10.40	0	15.0±0.5	Hg photo.	[1102]	
$H + N_2O = OH + N_2 +$ $+ 62.7$	423	~7	-	-	-	dis., flow	[1364]	
	813 - 973	-	-	0	15 - 20	, fl.	[1097,1099, 1098]	
	900	10.63	-	-	-	"	[469,470]	
	900 and 1357	-	13.37_4	0	11.85	"	[469]	
	1200 - 1800	-	14.48	0	16.0	"	[533,528,544]	
	1357	11.46	-	-	-	"	[469]	
	423 - 1800	-	13.7 ± 0.4	0	13.0±1.5	-	[470]	86
	"	-	13.95±0.21	0	13.53±0.73	-	-	87,88
$H + N_2O = NH + NO -$ $- 30.7±4$	-	-	11	1/2	30	est.	[1288]	
$H + NO_2 = OH + NO +$ $+ 29.6±1.8$	300	13.46±0.05	-	-	-	dis., flow	[1243]	
	500 - 540	13.92	-	-	-	therm., stat.	[1344]	89
	633	14.20	-	-	-	"	[49]	90
	300 - 630	-	14.73	0	1.74	-		91
$H + HNO = H_2 + NO +$ $+ 55.3±5$	226	>10.48	-	0	<4.0	dis., flow	[390]	92
	293	>9.78	-	-	-	"	[386]	
	1600 - 2000	12.72±0.24	-	-	-	fl.	[258]	93
	2000	12.67±0.11	-	-	-	"	[708]	
	-	-	~11.48	1/2	1.20-2.38	-	[1288]	
	-	-	12.59	1/2	0.9	est.	[1288]	
	-	-	"	1/2	0	"	"	
$H + HNO = OH + NH -$ $- 13.8±8$	-	-	11.3	1/2	13	est.	[1288]	
$H + NOCl = HCl + NO +$ $+ (66)$	300	> 12.1	-	-	-	dis., flow	[379]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + SF_6 = HF + SF_5$	1300 - 1940	-	15.3	0	30±5	fl.	[863]	
$H + CH_4 = H_2 + CH_3 +$ $+ 1.7\pm2.0$	372 - 436	-	10.01	0	4.5	W	[163]	
	485 - 803	-	11.78	0	7.4±1.1	dis., flow	[845]	
	600 - 700	-	13.11_5	0	9.1	photol.	[943]	94
	673 - 763	-	14.52	0	15.1	inhib.	[1746]	
	773 - 873	-	13.92_5	0	14.1	fl.	[1757]	
	843 - 933	-	13.08	0	10.6±1.0	inhib.	[1696]	
	883	10.47	-	-	-	"	[1695,1704]	
	900	10.54±0.24	-	-	-	fl.	[473]	
	970 - 1300	-	13.90	0	8.0	comp.	[1409]	95
	1100 - 1900	-	14.30	0	11.5±1.5	fl.	[539]	96
	"	-	13.48	0	8.2	"	[539,473]	
	372 - 1880	-	13.8±0.3	0	12.6±1.0	-	[473]	97
	372 - 1900	-	14.25_5	0	12.6	-	[94]	98
	500 - 800	-	~14.5	0	12 - 13	-	[541]	99
	-	-	13.3	-	-	calc.	[277]	
	500 - 2000	-	13.71±0.35	0	12.90±1.14	-	-	100
$H + C_2H_6 = H_2 + C_2H_5 +$ $+ 6.3\pm1.0$	298	7.13	-	-	-	dis.	[1423]	
	298	6.91	-	-	-	dis.	[1522]	
	"	6.86	-	-	-	"	[331]	
	"	6.91	-	-	-	"	[1522]	101
	308	7.16	-	-	-	"	[1430]	
	353 - 436	-	12.14	0	6.2±0.1	dis., flow	[161]	
	405 - 512	-	-	0	8.6	γ radiol.	[1646]	102
	473	8.18	-	-	-	dis.	[1423]	
	513 - 593	-	14.32	0	7.5	from k_- and K	[1312]	103
	773 - 873	-	13.98	0	11.9	fl.	[1757]	
	783 - 893	-	13.40	1/2	16	inhib.	[1766,1767]	104
	813	11.46_5	-	-	-	"	[93,96]	
	843 - 933	-	13.86	0	9.5	"	[1698]	1678
	903	9.48	-	-	-	therm.	[177]	105
	980 - 1440	-	14.14	0	9.7±2.0	fl.	[541]	106
	298 - 473	-	10.21	0	4.4	dis.	-	107
	300 - 1500	-	14.12±0.20	0	9.7±0.5	-	[89,80]	108
	"	-	14.12±0.25	0	9.71±0.58	-	[93]	109
	"	-	$14.16_5\pm0.06_5$	0	9.90±0.17	-	"	110
	285 - 1440	-	14.01±0.08	0	9.57±0.14	-	-	111

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + C_3H_8 = H_2 + C_3H_7 + 9\pm2$	298	7.45	-	-	-	dis.	[1522]	
	"	7.44	-	-	-	"	[1522,1428]	
	"	6.63	-	-	-	"	[1522,1518]	
	"	7,34	-	-	-	"	[1367]	
	300 - 445	-	13.91	0	8.17	photol.	[436, 83]	
	300 - 473	-	-	-	-	Hg photo.	[279]	112
	333 - 450	-	14.09	0	8.2	dis.	[906]	
	368 - 443	-	14.12	0	8.2	"	[905]	
	"	-	13.72	0	7.49	"	[905, 83]	
	405 - 512	-	12.2	1/2	7.0	γ radiol.	[1646,1644]	102
	773 - 873	-	13.56_5	0	8.4	fl.	[1757]	
	793	11.66	-	-	-	inhib.	[83]	113
	813 - 893	-	12.12	1/2	10.3	"	[1767]	104
	"	-	13.90	0	9.03	"	"	"
	843 - 933	-	12.95 ± 0.08	0	7.2	"	[1698]	
	303 - 800	-	13.81 ± 0.37	0	7.83 ± 0.79	-	[83]	114
	333 - 933	-	13.01 ± 0.15	0	6.22 ± 0.36	-	-	115
$H + n\text{-}C_4H_{10} = H_2 + C_4H_9 + (10)$	298	7.25	-	-	-	dis.	[1367]	
	308 - 523	-	-	-	-	dis.	[1425]	
	318 - 488	-	11.8	1/2	6.3	γ radiol.	[1646]	102
	333 - 450	-	13,82	0	7.1	dis.	[906]	117
	793	11,71	-	-	-	inhib.	[98]	116
	843 - 933	-	12.72	0	6.7	"	[1698]	
	300 - 793	-	13.9 ± 0.2	0	7.5 ± 0.5	-	[98]	118
	320 - 930	-	12.61 ± 0.30	0	$5,24\pm0.64$	-	-	119
$H + iso\text{-}C_4H_{10} = H_2 + C_4H_9 + (14)$	300 - 474	-	11.6	1/2	4.7	γ radiol.	[1646]	102
	305 - 523	-	-	-	-	dis.	[1595]	
	773 - 813	-	12.23	1/2	7.6	inhib.	[1767]	104
	"	-	14.01	0	6.33	"	"	"
	793	11.96	-	-	-	"	[98]	116
	300 - 793	-	14.0 ± 0.2	0	6.8 ± 0.5	-	"	118
	300 - 800	-	$13,27\pm0.09$	0	5.33 ± 0.17	-	-	120
$H + n\text{-}C_5H_{12} = H_2 + C_5H_{11}$	298	7.58	-	-	-	dis.	[1367]	
$H + iso\text{-}C_5H_{12} = H_2 + C_5H_{11}$	298	9.57	-	-	-	Hg photo.	[968]	121

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + (CH_3)_4C = H_2 + CH_2C(CH_3)_3 + 9 \pm 3$	295	7.03_4	-	-	-	dis.	[1522]	
$H + n\text{-}C_6H_{14} = H_2 + C_6H_{13}$	289	7.6	-	-	-	Hg photo.	[1104]	122
	298	7.22	-	-	-	dis.	[1367]	
$H + C_2H_3 = H_2 + C_2H_2$	313	$\gt 12$	-	-	-	dis.	[1560]	
	1200 - 1700	-	12.6	0	0	therm.	[152]	
$H + C_2H_4 = H_2 + C_2H_3 - 0.7$	773 - 873	-	13.06	0	6.3	fl.	[1757]	
	793 - 863	-	11.89	1/2	8.6	inhib.	[1766,1767]	104
	813	11.40	-	-	-	"	[97]	123
	843 - 933	-	12.93 ± 0.15	0	7.2 ± 0.5	"	[1701]	
$H + C_3H_6 = H_2 + C_3H_5$	773 - 873	-	12.24	0	2.5	fl.	[1757]	
H + trimethylethylene = $= H_2 + C_5H_9$	291	11.86_5	-	-	-	Hg photo.	[15]	
H + cyclo- $C_3H_6 = H_2 +$ cyclo- C_3H_5	298	6.69	-	-	-	dis.	[1367]	
H + cyclo- $C_4H_8 = H_2 +$ cyclo- C_4H_7	298	7.75	-	-	-	dis.	[1367]	
H + cyclo- $C_5H_{10} = H_2 +$ cyclo- C_5H_9	298	8.23	-	-	-	dis.	[1367]	
H + cyclo- $C_6H_{12} = H_2 +$ cyclo- C_6H_{11}	298	7.95	-	-	-	dis.	[1367]	
	"	7.55	-	-	-	Hg photo.	[1104]	122
$H + C_2H_2 = H_2 + C_2H - 10 \pm 10$	298	10.71	-	-	-	W	[1511]	124
	773 - 873	-	11.89	0	3.6	fl.	[1757]	
	1000 - 1700	-	14.30	0	19.0	comp.	[248]	
$H + C_6H_6 = H_2 + C_6H_5 + 1$	298	$\gt 8.48$	-	-	-	dis.	[1367]	
	773 - 873	-	13.90	0	6.2	fl.	[1757]	
$H + C_6H_5CH_3 = H_2 + C_6H_5CH_2 + 20$	773 - 873	-	12.78	0	2.2	fl.	[1757]	
	1200 - 1700	-	13.5	0	6	therm.	[152]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + CH_3OH = H_2 + CH_2OH$	773 - 873	-	13.12	0	7.1	fl.	[1757]	
	823 - 903	-	12.12	0	8.5	inhib.	[1748]	19
$H + C_2H_5OH = H_2 + C_2H_4OH$	773 - 873	-	13.38_5	0	5.5	fl.	[1757]	
	843 - 963	-	13.08	0	8.1	inhib.	[1755]	19
$H + n\text{-}C_3H_7OH = H_2 + C_3H_6OH$	863 - 963	-	13.44	0	6.5	inhib.	[1753]	19
$H + iso\text{-}C_3H_7OH = H_2 + C_3H_6OH$	773 - 873	-	13.37	0	6.3	fl.	[1757]	
	843 - 963	-	13.39	0	6.4	inhib.	[1753]	19
$H + n\text{-}C_4H_9OH = H_2 + C_4H_8OH$	863 - 963	-	13.32	0	5.1	inhib.	[1753]	19
$H + tert\text{-}C_4H_9OH = H_2 + [C_4H_9O]$	863 - 963	-	13.24	0	5.3	inhib.	[1753]	19
$H + CH_3SH = H_2 + CH_3S$	room	-	-	-	-	photol.	[969]	125
	room?	-	-	-	-	photol. CH_3SH	[1433]	127
	323 - 493	-	-	0	4.6	photol.	[817]	126, 48
$H + C_2H_5SH = H_2 + C_2H_5S$	room	-	-	-	-	photol.	[969]	128
	room?	-	-	-	-	photol. C_2H_5SH	[1433]	129
$H + n\text{-}C_3H_7SH = H_2 + n\text{-}C_3H_7S$	room	-	-	-	-	photol.	[969]	130
$H + n\text{-}C_4H_9SH = H_2 + n\text{-}C_4H_9S$	room	-	-	-	-	photol.	[969]	131
$H + CH_3OCH_3 = H_2 + CH_2OCH_3$	298	8.52	-	-	-	dis.	[1521]	
$H + (CH_2)_2O = H_2 + C_2H_3O$	298	7.35	-	-	-	dis.	[1521]	
$H + HCO = H_2 + CO$	300	-	-	-	-	dis., flow	[1184]	132
	1000 - 1700	13.3	-	-	-	comp.	[248]	
$H + HCHO = H_2 + HCO$	300	10.41 ± 0.11	-	-	-	dis., flow	[223]	
	476 - 573	-	-	0	< 5	photol.	[300]	133
	523 - 673	-	11.60	1/2	2.0	"	[1094]	134

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	523 - 673	-	13.00	0	3.0	photol.	[1094]	135
	"	-	11.68	1/2	2.67	low lim.	[87]	136
	600 - 1000	-	11.79	1/2	2.7	"	"	137
	"	-	11.83	1/2	3.67	"	"	138
	623 - 723	-	-	0	16.2	photol.HCHO	[4]	
	300 - 813	-	13.50	0	4.24	-	-	139
$H + DCDO = HD + CDO$	523 - 673	-	11.60	1/2	3.0	photol.	[1094]	140
$H + CH_3CHO = H_2 + CH_3CO$	298	<9.35	-	-	-	dis.	[1521]	141
$H + CH_3COCH_3 = H_2 +$ $+ CH_2COCH_3$	298	7.50	-	-	-	dis.	[722]	
	773 - 873	-	13.45	0	7.6	fl.	[1757]	
	298 - 873	-	13.66±0.02	0	8.385±0.04	-	-	142
$H + CH_2CO = CH_3 + CO +$ $+ 5\pm7$	298	10.89	-	-	-	dis. , flow	[321]	
$H + (C_2H_5)_4Si = H_2 +$ $+ (C_2H_5)_3SiC_2H_4$	793	12.34	-	-	-	upper lim.	[88]	
$H + CH_3F = HF + CH_3$	858 - 933	-	12.76	0	3.8	inhib.	[1758]	143
$H + CF_3H = H_2 + CF_3$	336 - 374	-	12.50_4	0	11.2	from k_- and K	[24]	
	970 - 1300	-	12.70	0	5.0	comp.	[1409]	
	336 - 1300	-	14.53±0.32	0	14.42± ±0.69	-	-	144
	300 - 700	-	13.02	0	7.83	from k_- and K	-	49, R
$H + CF_4 = HF + CF_3$	1323 - 1523	-	14.66	0	42.2	therm. , flow	[1740]	
$H + CH_3Cl \begin{cases} HCl + CH_3 \\ H_2 + CH_2Cl \end{cases}$	463	-	-	0	>7.2	dis. ,p → 0	[410]	
$H + CH_2Cl_2 \begin{cases} HCl + CH_2Cl \\ H_2 + CHCl_2 \end{cases}$	463	-	-	0	<5.8	dis. ,p → 0	[410]	
$H + CCl_2D = CClD + HCl$ и $CHCl + DCl$	298	-	-	-	-	dis. ,H_2	[363]	145

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + CHCl_3 \to HCl + CHCl_2$; $\to H_2 + CCl_3$	463	-	-	0	<4.3	dis. , p → o	[410]	
$H + CDCl_3 = HD + CCl_3$ and $HCl + CDCl_2$	room	-	-	-	-	dis. , H_2, flow	[363]	146
$H + CCl_3 = HCl + CCl_2$	298	-	-	-	-	dis. , H_2	[363]	147
$H + CCl_4 = HCl + CCl_3 + 35.2$	294 - 473	-	11.34	1/2	3.45	dis.	[1539]	
	463	-	-	0	<3.3	dis. ,p → o	[410]	
$H + CH_3Br = HBr + CH_3$	463	-	-	0	<3.2	dis. ,p → o	[410]	
$H + CH_3I = HI + CH_3$	463	-	-	0	<3.2	dis. ,p → o	[410]	
$H + CHClBr = HBr + CHCl$ and $HCl + CHBr$	298	-	-	-	-	dis. , H_2	[363]	148
$H + CCl_2HBr = HBr + CCl_2H$ and $HCl + CClHBr$	room	-	-	-	-	dis. , H_2, flow	[363]	149
$H + CCl_2HBr = H_2 + CCl_2Br$, $HCl + CClHBr$	room	-	-	-	-	dis. , H_2, flow	[363]	150
$H + CFCl_2 = HCl + CFCl$ and $HF + CCl_2$	298	-	-	-	-	dis. , H_2	[363]	151
$H + CCl_3F = HF + CCl_3$ and $HCl + CCl_2F$	room	-	-	-	-	dis. , H_2, flow	[363]	152
$H + CF_3Br = HBr + CF_3$	970 - 1300	-	15.64	0	17.45	comp.	[1409]	
$H + CCl_2Br = HBr + CCl_2$ and $HCl + CClBr$	298	-	-	-	-	dis. , H_2	[363]	153
$H + CCl_3Br = HBr + CCl_3$ and $HCl + CCl_2Br$	room	-	-	-	-	dis. , H_2, flow	[363]	154
$H + C_2H_3Cl = HCl + C_2H_3$	room	10.76	-	-	-	photol. HI	[1314]	155
$H + C_2H_3Cl = H_2 + C_2H_2Cl$	room	10.93	-	-	-	photol. HI	[1314]	155

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + C_2H_5I = HI + C_2H_5$	463	-	-	0	<4.5	dis. ,p → o	[410]	
$H + C_2F_4Br = HBr + C_2F_4$	970 - 1300	-	16.30	0	11.5	comp.	[1409]	
$H + C_2F_4Br_2 = HBr + C_2F_4Br$	970 - 1300	-	16.0	0	14.5	comp.	[1409]	
$H + CH_3NH_2 = H_2 + [CNH_4]$	843 - 963	-	12.54	0	9.1	inhib.	[1748]	19
$H + (CH_3)_2NH = H_2 + [C_2NH_6]$	863 - 963	-	13.21	0	10.8	inhib.	[1754]	19
$H + (CH_3)_3N = H_2 + CH_2(CH_3)_2N$	883 - 963	-	13.86_5	0	11.8	inhib.	[1754]	19
$H + C_2H_5NH_2 = H_2 + [C_2NH_6]$	883 - 963	-	13.10	0	8.7	inhib.	[1749]	19
$H + (C_2H_5)_2NH = H_2 + [C_4NH_{10}]$	853 - 958	-	13.63_4	0	9.2	inhib.	[1751]	19
$H + (C_2H_5)_3N = H_2 + C_2H_4(C_2H_5)_2N$	853 - 943	-	13.94	0	10.5	inhib.	[1751]	19
$H + n\text{-}C_3H_7NH_2 = H_2 + [C_3NH_8]$	883 - 963	-	13.14	0	8.0	inhib.	[1749]	19
$H + n\text{-}C_4H_9NH_2 = H_2 + [C_4NH_{10}]$	868 - 958	-	13.06	0	7.6	inhib.	[1750]	19
$H + CH_3N_2CH_3 = CH_4 + CH_3N_2$	383	6.31	-	-	-	dis. , H_2	[756]	
$H + Hg(CH_3)_2 = CH_4 + Hg + CH_3$	293	-	-	0	≤ 6	dis.	[723]	156
$H + H + H = H_2 + H$	room	14.7	-	-	-	dis.	1437,1438, 1491	
	"	<15.35	-	-	-	dis. , flow	[139]	157
	300	15.93	-	-	-	dis.	[1413]	158
	"	16.01	-	-	-	dis.	[17]	
	"	16.30	-	-	-	calc.	[1717]	
	303	16.11	-	-	-	dis.	[18]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	1700	15.7	-	-	-	est.	[1376]	
	2500	16.95_3	-	-	-	shock	[809]	
	2500–5500	-	40.75	-7	-	"	"	
	2800–5000	-	19	-1	0	"	[1322]	159, 160
	2900–4700	-	19.3	-1	0	"	[829]	
	2950–5330	-	19.70	-1	0	"	[1220]	159
	3000	15.04	-	-	-	"	[602]	
	3000–3500	-	21.26	-3/2	0	"	[1459]	
	3500–4800	-	33.40	-4.9_3	0	"	"	
	4500	14.95_4	-	-	-	"	[602]	
	5500	14.56_7	-	-	-	"	[809]	
	300–3500	-	17.47±0.29	-1/2	0	-	[1737]	
$H + H + Na = H_2 + Na'(3^2P)$	1250–1750	17.16	-	-	-	fl.	[315]	
$H + H + Na = H_2 + Na'$	1500	15.86	-	-	-	fl.	[1212]	
$H + H + He = H_2 + He$	296	15.86	-	-	-	dis., flow	[1706]	
	1900	15.67	-	-	-	fl.	[707]	
	190–350	-	16.59	-0.5	0	dis., flow	[981]	
	213	15.45±0.05	-	-	-	dis.	[983, 1491]	
	213–349	-	17.03	-0.68	0	"	[983]	
	"	-	17.4±1.7	-0.7±0.7	0	dis., flow	[981]	
	291	15.36±0.05	-	-	-	"	"	
	293	15.35±0.08	-	-	-	dis.	[982, 983]	
	296	15.75±0.03	-	-	-	dis., flow	[1706]	
	349	15.30±0.06	-	-	-	dis.	[983]	
	960–1080	-	18.17_5	-1	0	shock	[1408]	161
	1700	14.54±0.24	-	-	-	"	[1375, 1376]	
	1900	15.34	-	-	-	fl.	[707]	
	2800–4500	-	17.81	-1	0	shock	[1459]	162, 163
	2800–5000	-	18.17_6	-1	0	"	[1322]	159, 164
	2900–4700	-	18.0	-1	0	"	[829]	
	2950–5330	-	17.87_4	-1	0	"	[1220]	159
	3800–5300	-	18.30	-1	0	"	[828]	
	200–5330	-	17.49±0.22	-0.87±0.07	0	-	-	165
$H + H + Tl = H_2 + Tl'$	1500–2000	14.9	-	-	-	fl.	[1246]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + H + Pb = H_2 + Pb$	1500–2000	-	-	-	-	fl.	[1246]	
$H + H + H_2 = H_2 + H_2$	291	15.82±0.10	-	-	-	dis. , flow	[981]	
	293	≤15.83±0.08	-	-	-	dis.	[1437]	
	"	15.72	-	-	-	"	[18]	
	"	16.21±0.04	-	-	-	"	[18, 1627]	166
	"	15,97	-	-	-	"	[1673]	
	"	16.20±0,03	-	-	-	"	[1627]	
	"	15.53±0.07	-	-	-	-	[982, 983]	167
	"	16.13	-	-	-	calc.	[965]	
	room	16.64	-	-	-	photochem.	[1404]	
	"	15.92±0.08	-	-	-	-	[1413, 1491]	
	"	15.12_5±0.06_5	-	-	-	dis. , flow	[139]	157
	300	16.20	-	-	-	dis.	[20]	
	"	15.93	-	-	-	Hg photo.	[525]	
	"	16.07	-	-	-	dis. , flow EPR	[1055]	168
	300 or 350	16.25±0.02	-	-	-	dis.	[965]	
	1072	15.50	-	-	-	fl.	[468, 469]	169
	1400	15.94	-	-	-	"	[1339]	170
	1700	15.3	-	-	-	est.	[1376]	
	2500	15.14_5	-	-	-	shock	[809]	
	2500–7000	-	20.6	-3/2	0	"	"	
	2800–4500	-	18.41	-1	0	"	[1459]	162
	2800–5000	-	18.48	-1	0	"	[1322]	159, 160
	2900–4700	-	18.40	-1	0	"	[829]	
	2950–5330	-	18.87_5	-1	0	"	[1220]	159
	7000	14.59	-	-	-	"	[809]	
	-	-	18.7	-1	0	-	[1287]	
	-	-	18.3	-1	0	-	"	
	290–7000	-	18.78±0.15	-1.09 ±0.05	0	-	-	171
$H + H + N_2 = H_2 + N_2$	1072	15.28	-	-	-	fl.	[469, 468]	172
	1400	14.56	-	-	-	"	[1339]	170
	1900	15.56	-	-	-	"	[707]	
	2080	~16.34	-	-	-	"	[1072]	173
$H + H + HF = H_2 + HF$	-	-	18.87_4	-1	0	est.	[1287]	
	-	-	19.0	-1/2	0	"	"	
	-	-	19.47_6	-1	0	"	"	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + H + H_2O = H_2 + H_2O$	293	$\leq$ 16.7	-	-	-	dis.	[983, 981]	174
	960–1080	-	19.48	-1	0	shock	[1408]	175
	1072	15.28	-	-	-	fl.	[469, 468]	172
	1650	16.34	-	-	-	"	[257]	173
	1700	15.3	-	-	-	est.	[1376]	
	2080	17.17_6	-	-	-	fl.	[1072]	173
$H + H + CO = H_2 + CO$	1900	15.7	-	-	-	fl.	[707]	176
$H + H + CO_2 = H_2 + CO_2$	1900	15.7	-	-	-	fl.	[707]	176
	2080	17.08	-	-	-	"	[1072]	
$H + H + SO_2 = H_2 + SO_2$	2080	18.60	-	-	-	fl.	[1072]	
$H + H + M = H_2 + M$	1273	15.70	-	-	-	fl.	[468]	177
	1500	15.60	-	-	-	"	[878]	"
	1650	15.48	-	-	-	"	[257]	177, 178
	1750	15.67	-	-	-	shock	[488]	179
	2078	15.48	-	-	-	fl.	[1491, 1313]	178
	2250	15.46	-	-	-	shock	[488]	179
	2750	15.32	-	-	-	"	"	"
	1273–2078	-	20.36	-3/2	-	fl.	-	180
	-	-	20.58	-1.5	-1.635	-	[1287]	
$H + N + M = NH + M$	room	$\leq$ 14.68	-	-	-	-	[1068]	
$H + O \rightarrow OH'(A^2\Sigma^+) \rightarrow$ $\rightarrow OH + h\nu$	300	3.23±0.15	-	-	-	dis. N_2	[1503]	
$H + F + H = HF + H$	-	-	17.54_4	-1/2	0	est.	[1287]	
$H + F + H_2 = HF + H_2$	-	-	17.84_4	-1/2	0	est.	[1287]	
$H + F + OH = HF + OH$	-	-	19	-1/2	0	est.	[1287]	
	-	-	18.7	-1/2	0	"	"	
$H + F + HF = HF + HF$	-	-	19	-1/2	0	est.	[1287]	
$H + F + H_2O = HF + H_2O$	-	-	19	-1/2	0	est.	[1287]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	-	-	18.7	-1/2	0	est.	[1287]	
H + F + M = HF + M	-	-	18.87_4	-1	0	est.	[1287]	
	-	-	18	-1	0	calc.	"	
	-	-	15.69_3	0	-3.05	"	"	
	-	-	15.69	0	-3.05	-	"	
	-	-	15.03_7	1/2	0	calc.	"	
H + Cl + Tl = HCl + Tl'	1500-2000	15.9	-	-	-	fl.	[1246]	
H + Cl + Pb = HCl + Pb'	1500-2000	-	-	-	-	fl.	[1246]	
H + Cl + M = HCl + M	-	-	19	-1/2	0	est.	[1287]	
	-	-	17.94_4	-1	0	"	"	
	-	-	16.47_7	-1	0	"	"	
H + Br + Tl = HBr + Tl'	1500-2000	15.3	-	-	-	fl.	[1246]	
H + OH + Na = H_2O + Na'	1500	16.34	-	-	-	fl.	[1212]	
H + OH + K = H_2O + K'	2300-2400	17.73	-	-	-	fl.	[1661]	
H + OH + He = H_2O + He	300	17.32	-	-	-	dis.	[1196]	181
	1900	15.86	-	-	-	fl.	[707]	
H + OH + Ar = H_2O + Ar	960-1080	-	19.55_5	-1	0	comp.	[1408]	
	1307-1846	15.73±50%	-	-	-	shock	[619]	
	1400-3000	-	18.95_4	-1	-	"	[247]	
	1700	15.48±0.58	-	-	-	"	[1376]	182
	1900	15.81	-	-	-	fl.	[707]	
H + OH + Tl = H_2O + Tl'	1500-2000	15.3	-	-	-	fl.	[1246]	
H + OH + Pb = H_2O + Pb'	1500-2000	-	-	-	-	fl.	[1246]	
H + OH + H_2 = H_2O + H_2	1400	17.56	-	-	-	fl.	[1339]	
H + OH + N_2 = H_2O + N_2	1072	16.95	-	-	-	fl.	[469, 468]	172
	1400	16.67	-	-	-	"	[1339]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	1900	15.67	-	-	-	fl.	[707]	
	2080	~16.34	-	-	-	"	[1072]	
	1072-2000	-	24.3	-2.43	0	-	-	183
$H + OH + OH = H_2O + OH'$	2300-2400	15.86	-	-	-	fl.	[1661]	
$H + OH + H_2O = H_2O +$ $+ H_2O$	300	17.69	-	-	-	dis.	[1196]	181
	960-1080	-	20.86	-1	-	comp.	[1408, 257]	
	1072	16.95	-	-	-	fl.	[469, 468]	172
	1400	17.0	-	-	-	"	[1339]	
	1650	17.73	-	-	-	"	[257]	184
	1900	15.94	-	-	-	"	[707]	
	2080	17.17	-	-	-	"	[1072]	
	2225	17.06	-	-	-	"	[1211]	
$H + OH + CO_2 = H_2O +$ $+ CO_2$	1900	14.26	-	-	-	fl.	[707]	176
	2085	17.06	-	-	-	"	[1072]	
$H + CO + M = HCO + M$	300	-	-	-	-	Hg photo., $p \rightarrow o$	[525]	185
$H + NO + He = HNO + He$	293	15.81±0.07	-	-	-	dis., flow	[390]	
$H + NO + Ne = HNO + Ne$	293	15.85±0.06	-	-	-	dis., flow	[390]	
$H + NO + Ar = HNO + Ar$	293	15.93±0.08	-	-	-	dis., flow	[390, 395]	
	-	-	15.49	0	-0.7±0.3	-	[395]	186
$H + NO + H_2 = HNO + H_2$	231-704	-	18.37±0.73	-0.9± ±0.3	0	dis., flow	[390]	187
	"	-	15.73	0	-0.6±0.2	"	[390, 258]	
	294	15.68	-	-	-	"	[386]	
	298	16.04	-	-	-	dis.	[1406]	188
	"	16	-	-	-	-	[742]	
	-	-	17	-1/2	0.7	-	[1288]	
$H + NO = HNO$	-	-	18.98_6	-1	0	fl.	[258]	
$H + NO + M = HNO + M$	-	-	15.55_5	0	-0.6	-	[1288]	
$H + NO \rightarrow HNO$	903	11.2	-	-	-	therm.	[177]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + O_2 = HO_2^*$	room	13.50_4	-	-	-	Hg photo.	[264]	
$H + O_2 + He = HO_2 + He$	293±3	16.33±0.13	-	-	-	mass spect.	[1725, 1723]	
	293	15.88±0.04	-	-	-	dis., flow	[395]	
$H + O_2 + Ar = HO_2 + Ar$	225-293	-	15.03	0	-1.3±0.7	dis., flow	[395]	
	293	16.13	-	-	-	dis.	[982,395,378]	
	"	15.90±0.04	-	-	-	dis., flow	[395]	
	"	16.06_5±0.11	-	-	-	dis.	[371]	
	813	15.23	-	-	-	fl.	[79]	
	960-1080	15.91_5	-	-	-	comp.	[1408]	
	1100	15.52	-	-	-	shock	[699]	189
	1300-1500	15.4	-	-	-	"	[620]	
	1500	15.15±0.08	-	-	-	"	[621]	
	225-1500	-	15.30±0.05	0	-0.87± ±0.07	-	[699]	190
	"	-	18.12±0.22	-0.88 ±0.08	0	-	"	"
	225-1850	-	14.98	0	-1.28± ±0.09	-	[621]	191
	250-800	-	20.37_5	-1.8	0	dis., flow	[395]	192
	"	-	14.67	0	-1.6±0.7	"	"	"
	293-1500	-	19.09±0.51	-1.24 ±0.19	0	-	-	193, 194
$H + O_2 + H_2 = HO_2 + H_2$	293	13.84	-	-	-	Hg photo.	[525]	195
	"	14.52	-	-	-	photochem.	[401]	
	"	14.64	-	-	-	dis., flow	[1673]	
	"	16.60	-	-	-	dis.	[395]	196
	"	17.46	-	-	-	est.	[1328]	
	"	17.26	-	-	-	-	[1221]	
	293-319	17.80_6	-	-	-	photochem.	[264]	
	293 and 793	-	15.2	0	-3.5	-	[115, 788]	197
	293-803	-	15.7	0	-1.3±0.5	comp.	[91]	41
	300-647	-	-	-	-4.8	Hg photo.	[265]	198, 199
	700-800	-	15.06	0	-3.55	ignit. lim.	[972]	200
	770	15.73	-	-	-	fl.	[1554]	
	793	~16.16	-	-	-	"	[99]	201
	813	15.92	-	-	-	"	[79]	
	293-813	-	15.50±0.10	0	-1.89± ±0.21	-	-	202
	"	-	22.03±0.47	-2.08 ±0.17	0	-	-	"

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + O_2 + O_2 = HO_2 + O_2$	273	14.08	-	-	-	photol.	[401]	
	293 and 793	-	15.08	0	-2.5	-	[115]	203
$H + O_2 + H_2O = HO_2 + H_2O$	293	17.24±0.18	-	-	-	dis.	[395]	204
	293 - 319	19,39	-	-	-	photochem.	[264]	
	1000 - 1350	-	21.625	-3/2	0	fl.	[544]	
	1300	17.0	-	-	-	"	"	
	1500	~16.63	-	-	-	shock	[621]	
	1530	15.90	-	-	-	fl.	[473]	
$H + O_2 + M = HO_2 + M$	600 - 800	14.71±0.15	-	-	-	fl. , comp.	[1708]	177
	800	16.01±0.15	-	-	-	fl.	[1695]	"
	~800	15.63	-	-	-	"	[1700,1554]	
$H + O_2 + CF_4 = HO_2 + CF_4$	293 - 319	19.13	-	-	-	photochem.	[264]	
$H + O_2 + SF_6 = HO_2 + SF_6$	293 - 319	19.13	-	-	-	photochem.	[264]	
$H + SO_2 + H_2 = HSO_2 + H_2$	784	16.16	-	-	-	inhib.	[1577]	205
$H + SO_2 + H_2O = HSO_2 + H_2O$	~2000	17.34	-	-	-	fl.	[874]	
$H + SO_2 + M = HSO_2 + M$	1480-1660	16.85	-	-	-	fl.	[545]	177,206,207
	1647	15.86	-	-	-	"	[876]	177,207,208
	1660	16.13	-	-	-	"	"	
	~ 2000	16.33_4	-	-	-	"	[875]	177, 209
$H + CH_3 \rightarrow CH_4$	293±3	13.21±0.13	-	-	-	mass spect.	[1727]	210
	296±3	12.99±0.13	-	-	-	"	[1723]	
$H + CH_3 + He = CH_4 + He$	300	19.43	-	-	-	mass spect.	[1727]	
$H + CH_3 + Ar = CH_4 + Ar$	300	18.92	-	-	-	mass spect.	[1727]	
	970-1300	-	22.08	-1	0	comp.	[1409]	211
$H + CH_3 + H_2 = CH_4 + H_2$	970-1300	-	22.38	-1	0	comp.	[1409]	211

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + C_2H_4 = C_2H_5$	room	11.77±0.07	-	-	-	pulse photol.	[220]	
	"	11.73±0.05	-	-	-	dis. , flow	[1116,220]	
	296±3	12.05±0.16	-	-	-	diff. cloud	[1728]	
	296 - 540	-	13.43	0	2.0±0.8	"	[1728,1729]	
	297	11.38	-	-	-	Hg photo.	[847, 97]	212
	330 - 520	-	13.0	0	1.82	radiol.	[1644]	215
	813	12.37	-	-	-	inhib.	[97]	216
	298 - 813	-	13.47	0	3.18	-	"	217
	295 - 813	-	12.86±0.22	0	1.64±0.36	-	-	218
	295 - 813	-	$13.02±0.27_5$	0	1.77±0.45	-	-	219
$H + C_2H_4 + He = C_2H_5 + He$	296±3	18.2±0.3	-	-	-	mass spect.	[1728,1723]	
$H + C_2H_4 + H_2 = C_2H_5 + H_2$	293	16.79	-	-	-	Hg photo.	[289]	220
	813	18.94	-	-	-	ignit. lim.	[97]	
	298 - 813	-	17.75	1/2	0.98	-	[97]	221, R
$H + C_2H_4 + O_2 = C_2H_5 + O_2$	813	18.81	-	-	-	ignit. lim.	[97]	
$H + C_2H_4 \rightarrow C_2H_5$	289	11.70	-	-	-	Hg photo.	[15]	
	"	11.87	-	-	-	"	[15,1105]	
	291	11.36	-	-	-	"	[1105]	
	room	11.38±0.21	-	-	-	dis. , flow	[1116]	
	298	10.94±0.02	-	-	-	dis. , EPR	[245]	213
	"	11.08±0.04	-	-	-	"	[246]	213,214
	300 - 463	-	-	0	1.74	Hg photo.	[436]	222
	304	11.23	-	-	-	"	[290]	223
	970 - 1300	-	13.60	0	1.58	comp.	[1409]	224
$H + C_2D_4 = C_2D_4H$	room	11.77±0.07	-	-	-	pulse photol.	[220]	
$H + C_2D_4 \rightarrow C_2D_4H$	room	~11.78	-	-	-	pulse dis.	[220]	
$H + C_2H_5 = C_2H_6$	970 - 1300	-	15.64	0	0	comp.	[1409,177]	225
$H + C_2H_5 \rightarrow C_2H_6$	903	13.65	-	-	-	therm.	[177]	105
$H + C_3H_6 = C_3H_7$	293±3	11.87±0.14	-	-	-	mass spect.	[1728]	
	329 - 513	-	14.02	0	3.7	radiol.	[1644,1645, 1491]	215

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	329 - 513	-	12.85	0	1.52	radiol.	[1644,1645, 1491]	226
$H + C_3H_6 \rightarrow C_3H_7$	289	11.21	-	-	-	Hg photo.	[15]	
	"	11.26	-	-	-	"	[15,1105]	
	291	10.69	-	-	-	"	[290,1105]	
	297	12.03	-	-	-	"	[847]	227
	300 - 473	-	14.40	0	3.83	"	[279]	228,229
	304	11.20	-	-	-	"	[290]	
	"	11.68	-	-	-	"	"	
	330 - 490	-	12.05	1/2	2.2±0.1	radiol.	[1644,1645]	230
	823 - 863	-	11.08	1/2	3.1	inhib.	[1766]	
$H + C_4H_8 = C_4H_9$	293	11.93±0.14	-	-	-	mass spect.	[1728]	
$H + C_4H_8\text{-}1 \rightarrow C_4H_9$	297	12.06	-	-	-	Hg photo.	[847]	227
$H +$ cis-$C_4H_8 = C_4H_9$	297 - 457	-	12.5	1/2	3.5	radiol.	[1645]	231
	"	-	14.48	0	4.9	"	[1644,1645, 1491]	215
	"	-	13.31	0	2.72	"	[1645]	232
$H +$ cis-$C_4H_8\text{-}2 \rightarrow$ $\rightarrow (CH_3)CHCH_2CH_3$	289	11.90	-	-	-	Hg photo.	[1106, 15]	
	297	11.70	-	-	-	"	[847]	227
$H +$ trans-$C_4H_8\text{-}2 =$ $= C_4H_9$	room	11.77±0.07	-	-	-	pulse photol.	[220]	
	297	11.80	-	-	-	Hg photo.	[847]	233
$H +$ trans-$C_4H_8\text{-}2 \rightarrow$ $CH_3CHCH_2CH_3$	289	11.80	-	-	-	Hg photo.	[1106, 15]	
	297 - 540	-	12.5	1/2	3.5	radiol.	[1645]	231
	"	-	14.50	0	4.9	"	[1644,1645, 1491]	215
	"	-	13.31	0	2.72	"	[1645]	232, R
$H +$ iso-$C_4H_8 = C_4H_9$	room	12.33±0.09	-	-	-	pulse dis.	[220]	234
	297	12.42	-	-	-	Hg photo.	[847]	227
	423 - 500	-	13.94_6	0	2.2	radiol.	[1644,1645, 1491]	215
	"	-	11.97±0.13	1/2	0.8±1.0	"	[1645]	231
	"	-	12.78±0.13	0	0.02±1.00	"	"	232
$H +$ iso-$C_4H_8 \rightarrow$ $\rightarrow (CH_3)_3C$	289	11.76	-	-	-	Hg photo.	[15]	
	297	11.93	-	-	-	"	[847]	235

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H + C_4H_8 \rightarrow C_4H_9$	room	11.62_4	-	-	-	Hg photo.	[1106]	
$H +$ cis-C_5H_{10}-2 $= C_5H_{11}$	289	11.76	-	-	-	Hg photo.	[15]	
$H +$ trimethylethylene $\rightarrow C_5H_{11}$	289	11.86_5	-	-	-	Hg photo.	[1106, 15]	
$H + (CH_3)_2CC(CH_3)_2 = C_6H_{13}$	320 - 457	-	11.81 ± 0.15	1/2	1.8 ± 0.3	radiol.	[1645]	231
	"	-	13.79	0	3.1	"	[1644, 1645, 1491]	215
	"	-	12.62 ± 0.15	0	1.02 ± 0.30	"	[1645]	232, R
$H +$ tetramethylethylene $\rightarrow C_6H_{13}$	289	11.68	-	-	-	Hg photo.	[1106, 15]	
	297	11.94	-	-	-	"	[847]	227
	323 - 475	-	11.8	1/2	1.8	radiol.	[1645]	231
	"	-	12.61	0	1.02	"	"	232
$H +$ 2,3,3-trimethyl-butene-1 $\rightarrow C_7H_{15}$	289	11.83_5	-	-	-	Hg photo.	[1106, 15]	
$H +$ butadiene $= C_4H_7$	395 - 500	-	11.99 ± 0.50	1/2	0.5 ± 1.0	radiol.	1645	231
	"	-	13.97_4	0	1.9	"	1644, 1645, 1491	215
	"	-	12.8 ± 0.5	0	-0.28 ± 1.00	"	1645	232
$H +$ butadiene-1,3 $\rightarrow C_4H_7$	297	12.71_4	-	-	-	Hg photo.	847	227
	"	12.22	-	-	-	"	"	235
$H + C_2H_2 = C_2H_3$	295	10.10	-	-	-	dis., flow EPR	805	
	313	10.38 ± 0.06	-	-	-	"	1560	
$H + C_2H_2 + H_2 = C_2H_3 + H_2$	313	17.96_5	-	-	-	dis., flow	1560	
$H + C_2H_2 \rightarrow C_2H_3$?	277 - 372	-	11.17	0	1.5	dis., flow	464	236,237
	room	11.56	-	-	-	dis., H_2	1116	
	298	10.71	-	-	-	"	1511	238
$H + C_2D_2 \rightarrow C_2HD_2$	room	10.86	-	-	-	dis., H_2	1115	
$H + CH_3CCH = C_3H_5$	298	$11.36_5 \pm 0.04_5$	-	-	-	dis., EPR	245	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
H + cyclohexene → cyclo-C_6H_{11}	289	11.90	-	-	-	Hg photo.	[1106, 15]	
$H + C_6H_6 = C_6H_7$	320 - 475	-	11.81±0.15	1/2	3.5±0.3	radiol.	[1645]	231
	"	-	13.79	0	4.9	"	[1644,1645, 1491]	215
	"	-	12.62±0.15	0	2.72±0.30	"	[1645]	232, R
$H + C_6H_6 \rightarrow C_6H_7$	289	11.03	-	-	-	Hg photo.	[15]	239
	room	11.81	-	-	-	"	[1106]	
	298	10.56±0.07	-	-	-	pulse radiol.	[1356]	
	300 - 357	-	12.69	0	2.9±0.6	"	"	
$H + C_6H_5CH_3 \rightarrow C_7H_9$	289	10.38	-	-	-	Hg photo.	[15]	
$H + C_6H_5CH_3 \rightarrow$?	298	11.00±0.05	-	-	-	pulse radiol.	[1356]	
$H + CH_3COCH_3 \rightarrow$ iso-C_3H_7O	523	-	10.8	0	7.5	therm.	[120]	240
H + methyl methacrylate → $C_5O_2H_9$	289	11.64	-	-	-	Hg photo.	[15]	
$H + CF_3 + Ar = CF_3H + Ar$	970 - 1300	-	20.30	-1	0	comp.	[1409]	
$H + CF_3 + H_2 = CF_3H + H_2$	970 - 1300	-	20.60	-1	0	comp.	[1409]	
$H + C_2F_4 \rightarrow C_2HF_4$	289	10.78	-	-	-	Hg photo.	[15]	
$H + C_2H_3Cl \rightarrow C_2H_4Cl$	room	10.61	-	-	-	photol. HI	[1314]	155
$H + C_2Cl_4 \rightarrow C_2HCl_4$	289	-	-	-	-	Hg photo.	[15]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$D + H_2 = HD + H$	196 - 298	-	-	0	7.61±0.46	photol. DI and DBr	[970]	241, 14
	274 - 468	-	15.56± lgΓ	-1/2	9.40	W	[1318,995]	3,242,243
	450 - 750	-	13.63_4±0.09	0	7.61±0.20	dis. flow, EPR	[1585]	
	700 - 1000	-	13.62	0	6.23	therm.	[1540,516]	
	850 - 1000	-	-	0	4.85	"	[519]	
	1000	12.40	-	-	-	"	"	
	1000	11.99	-	-	-	"	[187]	5
	283 - 1023	-	11.99	1/2	4.9	-	[1712]	244
	400 - 1000	-	13.70±0.03	0	7.73± ±0.085	-	-	245 ,R
$D + HD = DH + D$	700 - 1000	-	13.23_4	0	6.37	therm.	[1540,516]	
	1000	12.01	-	-	-	"	[519]	246
$D + DH = D_2 + H$	700 - 1000	-	13.32_5	0	6.61	therm.	[1540,516]	247
	850 - 1000	-	-	0	5.6	"	[519]	
	1000	11.90	-	-	-	"	"	248
	1000	11.60_2	-	-	-	"	[187]	5
$D + D_2 = D_2 + D$	283 - 1023	-	11.71	1/2	6.0	-	[1712]	244
	358 - 468	-	13.08_6±0.06	0	7.63±0.1	W	[995]	249
	873 - 973	-	13.54	0	6.8	therm.	[519,526]	250,251
	1000	12.06	-	-	-	"	[519]	252
$D + O_2 = OD + O - 15.2$	800 - 1000	-	13.93±0.11	0	14.9±0.4	low lim.	[972,973,974]	18, F
	803 - 933	-	13.68	0	14.9	"	[1698]	
	823 - 963	-	13.46	0	14.2	inhib.	[1722]	19
	800 - 1000	-	13.80±0.74	0	15.12± ±2.98	-	-	253
$D + I_2 = DI + I$	633 - 800	-	-	-	-	therm., stat.	[1450]	
$D + HCl = DH + Cl$	900	12.00	-	-	-	therm.	[1436]	
	-	-	-	-	4.6	est.	[993]	
$D + DI = D_2 + I$	633 - 800	-	-	-	-	therm., stat.	[1450]	254
$D + H_2O = HDO + H$	288 - 457	-	-	0	6.2	dis.	[616,615]	255
	573 - 873	-	-	0	7?	Hg photo.	[523]	256

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$D + D_2S = D_2 + DS$	298 - 451	-	12.99	1/2	5.0	photol.	[436]	257
	"	-	14.70	0	7.73	"	"	258
$D + NH_3 = NH_2D + H$	293 and 373	-	-	0	9±1	dis.	[615,616]	
	573 - 873	-	-	0	11±1	Hg photo.	[523]	
	693 - 833	-	-	0	10,7	"	[1102]	259
	953 - 1053	-	-	0	11±1	therm.	[518]	
	954 - 1061	-	-	0	~10	"	"	260
$D + NH_3 = DH + NH_2$	843 - 943	-	13.66	0	12.9	inhib.	[1720]	19
$D + PH_3 = PH_2D + H$	693 - 893	-	10.20	0	14.4±0.5	Hg photo.	[1102]	
$D + CH_3 = HD + CH_2$ or $CH_2D + H$	373 - 473	-	-	0	⩽5	Hg photo.	[1142]	
$D + CH_4 = CH_3D + H$	293 - 373	-	-	0	>11	dis.	[615,616]	
	373	-	-	-	-	Hg photo.	[1142]	261
	573 - 873	-	-	0	13±1	"	[523]	
$D + CH_4 = DH + CH_3$	298 - 398	-	13.56	0	8.5±0.5	β radiol.	[986]	
	523 - 673	-	11.30	1/2	7.8	therm.	[1094]	262
	"	-	12.92	0	10.13	"	"	263, R
$D + C_2H_6 = C_2H_5D + H$	386 - 581	-	-	-	11.4	dis.	[1518]	264
$D + C_2H_6 = DH + C_2H_5$	293	-	-	-	~6.5	Hg photo.	[1429]	
	298	6.94	-	-	-	dis.	[1522]	
	"	7.25_6	-	-	-	"	[1518,1522]	
	298 - 398	-	-	0	6.5±0.5	β radiol.	[986]	
	304 - 733	-	14.4	0	9.0	photol. D_2S	[436]	265
$D + C_2H_6 = CH_3D + CH_3$	299 - 581	-	-	0	7.2	dis.	[1518]	264
	371 - 761	-	-	0	~7.5	Hg photo.	[1142]	
$D +$ iso-$C_3H_7 = HD + C_3H_6$	358	-	-	-	-	photol.	[752]	266
$D + C_3H_8 = C_3H_7D + H$	298	6.86	-	-	-	dis.	[1367]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$D + C_3H_8 = DH + C_3H_7$	298	7.59	-	-	-	dis.	[1367]	
	304 - 600	-	14.46	0	7.2	photol. D_2S	[436]	267
$D + n\text{-}C_4H_{10} = n\text{-}C_4H_9D + H$	298	6.81	-	-	-	dis.	[1367]	
$D + n\text{-}C_4H_{10} = DH + C_4H_9$	298	6.92	-	-	-	dis.	[1367]	
	304 - 500	-	14.44	0	7.1	photol. D_2S	[436]	268
$D + iso\text{-}C_4H_{10} = DH + C_4H_9$	304 - 600	-	14.44	0	6,3	photol. D_2S	[436]	269
$D + n\text{-}C_5H_{12} = n\text{-}C_5H_{11}D + H$	298	7.30	-	-	-	dis.	[1367]	
$D + n\text{-}C_5H_{12} = DH + C_5H_{11}$	298	6.98	-	-	-	dis.	[1367]	
$D + (CH_3)_4C = DH + CH_2C(CH_3)_3$	297	6.88	-	-	-	dis.	[1522]	
$D + n\text{-}C_6H_{14} = n\text{-}C_6H_{13}D + H$	298	7.50	-	-	-	dis.	[1367]	122
$D + n\text{-}C_6H_{14} = DH + C_6H_{13}$	298	7.20	-	-	-	dis.	[1367]	
	"	7.81_6	-	-	-		[1104]	270
$D + C_2H_4 = C_2H_3D + H$	298 ± 1	-	-	-	-	Hg photo.	[506]	
$D + C_3H_6 = DH + C_3H_5$	298 - 573	-	13.7	0	5.0	photol. D_2S	[436]	271
$D +$ butene-2 $= DH + C_4H_7$	298 - 573	-	14.14	0	5.0	photol. D_2S	[436]	272
$D + C_2H_2 = C_2HD + H$	1200 - 1700	-	13.5	0	4.0	therm.	[152]	
$D + C_2H_2 = C_2H + HD$ or $\rightarrow C_2H_2D$	293	-	-	0	≤ 5	dis.	[615,616]	
$D +$ cyclo-$C_3H_6 = DH +$ cyclo-C_3H_5	298	7.04	-	-	-	dis.	[1367]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
D + cyclo-C_4H_8 = DH + + cyclo-C_4H_7	298	7.46	-	-	-	dis.	[1367]	
D + cyclo-C_5H_{10} = = cyclo-C_5H_9D + H	298	8.12	-	-	-	dis.	[1367]	
D + cyclo-C_5H_{10} = DH + + cyclo-C_5H_9	298	7.82	-	-	-	dis.	[1367]	
D + cyclo-C_6H_{12} = = cyclo-$C_6H_{11}D$ + H	298	7.71	-	-	-	dis.	[1367]	
D + cyclo-C_6H_{12} = DH + + cyclo-C_6H_{11}	298	7.67	-	-	-	dis.	[1367]	
D + C_6H_6 = DH + C_6H_5	298	>7.83	-	-	-	dis.	[1367]	
D + C_6H_6 = C_6H_5D + H	298	>8.13	-	-	-	dis.	[1367]	
D + CH_3OH = HD + [CH_3O]	843 - 943	-	12.21	0	8.6	inhib.	[1720]	19
D + C_2H_5OH = HD + + [C_2H_5O]	843 - 943	-	12.65	0	6.9	inhib.	[1720]	19
D + n-C_3H_7OH = HD + + [C_3H_7O]	843 - 943	-	12.63_6	0	5.6	inhib.	[1720]	19
D + n-C_4H_9OH = HD + + [C_4H_9O]	843 - 943	-	12.72	0	4.9	inhib.	[1720]	19
D + CH_3OCH_3 = DH + + CH_2OCH_3	298	~8.16	-	-	-	dis.	[1521]	
D + HCHO = DH + CHO	523 - 673	-	11.60	1/2	2.1	photol.	[1094]	273
D + DCDO = D_2 + CDO	523 - 673	-	11.60	1/2	3.0	photol.	[1094]	140
D + CD_3CDO = D_2 + CD_3CO	300	10.28±0.07	-	-	-	dis., flow	[1077]	
D + CH_3COCH_3 = DH + + CH_2COCH_3	298	6.95_4	-	-	-	dis.	[722]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$D + CH_3NH_2 = HD + [CNH_4]$	843 - 943	-	12.92_5	0	9.6	inhib.	[1720]	19
$D + C_2H_5NH_2 = HD + [C_2NH_6]$	843 - 943	-	13.10	0	8.4	inhib.	[1720]	19
$D + n\text{-}C_3H_7NH_2 = HD + [C_3NH_8]$	863 - 943	-	13.03	0	7.5	inhib.	[1720]	19
$D + D + D = D_2 + D$	300	15.88	-	-	-	dis.	[17]	
	2940 - 4895	-	18.84_4	-1	0	shock	[1324]	159,274
	3466 - 4520	-	19.30	-1	0	"	[830]	
	3500	15.30	-	-	-	"	[1324]	
	"	15.76	-	-	-	"	[1459]	275
	"	15.75	-	-	-	"	[1458]	
$D + D + Ar = D_2 + Ar$	2800 - 4500	-	17.90_3	-1	0	shock	[1459]	276
	3230 - 4895	-	17.84_4	-1	0	"	[1324]	159,274
	3466 - 4520	-	18.00	-1	0	"	[830]	
	3500	14.30	-	-	-	"	[1324]	
	"	14.36	-	-	-	"	[1458]	
$D + D + Kr = D_2 + Kr$	3500	14.30	-	-	-	shock	[1324]	
$D + D + D_2 = D_2 + D_2$	2800 - 4500	-	17.70	-1	0	shock	[1459]	276
	2940 - 4895	-	18.00	-1	0	"	[1324]	159,274
	3466 - 4520	-	18.24	-1	0	"	[830]	
	3500	14.49	-	-	-	"	[1324]	
	"	14.15	-	-	-	"	[1458]	
$D + O_2 + D_2 = DO_2 + D_2$	700 - 800	-	14.76	0	-4.35	fl.	[973]	277
$D + O_2 + M = DO_2 + M$	803	-	-	-	-	ignit. lim.	[1019]	278
$D + C_2H_4 = C_2H_4D$	296 - 650	-	11.77 ± 0.21	1/2	1.6 ± 0.4	mass spect.	[1728,1723]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Na + Cl_2 = NaCl + Cl$	573	15.3	-	-	-	rare. fl.	[1250]	
	573–623	14.61	-	-	-	"	[1249, 165]	
$Na + Br_2 = NaBr + Br$	533	14.7	-	-	-	diff. fl.	[733]	279
$Na + I_2 = NaI + I$	573–623	14.78	-	-	-	rare. fl.	[1249]	
$Na + HCl = NaCl +$	511	11.39	-	0	6.1±0.3	diff. fl.	[127]	280
$+ H - 4.2$	513	-	-	0	4.5	"	[731]	281
	520–820	-	-	0	6.25		"	
	600	12.7	-	-	-	rare. fl. "	[1363, 883]	
	700	13.3	-	-	-	"	" "	
$Na + DCl = NaCl + D$	511	11.31_6	-	0	6.4±0.3	diff. fl.	[127]	280
$Na + HBr = NaBr + H$	520	-	-	0	1.9	diff. fl.	[731]	281
$+ 0.8$	600	14.18	-	-	-	rare. fl.	[1363]	
	"	>13.78	-	-	-	"	[1363, 883]	
$Na + HI = NaI + H +$	513	-	-	0	0.2	diff. fl.	[731]	281
$+ 0.2$	600	15.1	-	-	-	rare. fl.	[1363]	
	"	14.7	-	-	-	"	[1363,883]	
$Na + CH_3F = NaF + CH_3$	520	7.3	-	-	-	-	1524	
	548	<8.7	-	0	> 25	diff. fl.	[732,1569]	279, 282
	"	~7.0	-	0	~18.5	"	[1569]	279, 283
$Na + CH_2F_2 = NaF +$	520	8.8	-	-	-	-	[1524]	
$+ CH_2F$	548	~8.86	-	0	~14.0	diff. fl.	[1569]	279, 283
$Na + CHF_3 = NaF + CHF_2$	520	8.8	-	-	-	-	[1524]	
	548	8.86	-	0	14.0	diff. fl.	[1569]	279, 283
$Na + CF_4 = NaF + CF_3$	520	9.4	-	-	-	-	[1524]	
	548	8.86	-	0	14.0	diff. fl.	[1569]	279, 283
$Na + C_2F_4 = NaF + C_2F_3$	520	11.0	-	-	-	-	[1524]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Na + C_6F_{12} = NaF + C_6F_{11}$	520	11.7	-	-	-	-	[1524]	
	548	11.71	-	0	7.1	diff. fl.	[1569]	279, 284
$Na + C_6F_{11}CF_3 = NaF + C_6F_{11}CF_2$	520	12.0	-	-	-	-	[1524]	
$Na + CH_3Cl = NaCl + CH_3$	492	10.78	-	-	-	rare. fl.	[596]	
	500-770	-	-	0	7.5±1	diff. fl.	[733]	279, 280
	533	10.89	-	0	8.8	"	[733, 514]	" "
	548	10.7	-	0	10.0	"	[732, 1569]	279, 285
$Na + CH_2Cl_2 = NaCl + CH_2Cl$	513	12.62	-	0	4.9	diff. fl.	[733]	279
	523	11.8	-	-	-	"	[1746]	"
	548	11.75	-	0	7.4	"	[732, 1569]	"
$Na + CHCl_3 = NaCl + CHCl_2$	523	13.0	-	-	-	diff. fl.	[717]	279
	543	13.89	-	0	2.0	"	[733]	"
	548	12.7	-	0	5.0	"	[732, 1569]	"
$Na + CCl_4 = NaCl + CCl_3$	523	13.97	-	-	-	diff. fl.	[717]	279
	"	14.47	-	0	0	"	[733]	"
	543	13.98	-	-	-	"	[754]	
	548	13.3	-	0	3.5	"	[732, 1569]	279
	583	12.17	-	0	8.4	"	[888]	286
$Na + C_2H_5Cl = NaCl + C_2H_5$	533-653	-	14.75	0	10.2±0.5	diff. fl.	[423, 239]	
	543	11.75	-	0	7.3	"	[733]	279
	548	10.85	-	0	9.4	"	[732, 1569]	"
$Na + CH_3CHCl_2 = NaCl + CH_3CHCl$	503 and 513	12.40-12.85	-	0	4.9	diff. fl.	[733]	279
	548	11.89	-	-	-	"	[732]	286
$Na + CH_2ClCH_2Cl = NaCl + CH_2ClCH_2$	543	12.36	-	0	5.8	diff. fl.	[733]	279
	548	11.80	-	-	-	"	[732]	286
	558	11.98	-	0	7.0	"	[511]	"

Reaction	T^oK	lg k	lg A	n	E	Method	Literature	Remarks
$Na + n\text{-}C_3H_7Cl = NaCl + n\text{-}C_3H_7$	520	9.4	-	-	-	-	[1524]	
	534	10.39	-	-	-	diff. fl.	[1317]	
	"	11.00	-	0	9.0	"	[511]	279
	548	11.06	-	0	9.2	"	[732, 1569]	
$Na + iso\text{-}C_3H_7Cl = NaCl + iso\text{-}C_3H_7$	548	11.18	-	0	8.6	diff. fl.	[732, 1569]	279
$Na + CH_2ClCH_2CH_2Cl = NaCl + CH_2ClCH_2CH_2$	548	11.70	-	-	-	diff. fl.	[732]	286
$Na + CH_3CHClCH_2Cl = NaCl + C_3H_6Cl$	548	12.00	-	-	-	diff. fl.	[732]	286
$Na + C_2H_5CHCl_2 = NaCl + C_2H_5CHCl$	548	12.22	-	-	-	diff. fl.	[732]	286
$Na + (CH_3)_2CCl_2 = NaCl + (CH_3)_2CCl$	548	12.45	-	-	-	diff. fl.	[732]	286
$Na + n\text{-}C_4H_9Cl = NaCl + n\text{-}C_4H_9$	548	11.18	-	0	8.6	diff. fl.	[732, 1569]	279
$Na + iso\text{-}C_4H_9Cl = NaCl + iso\text{-}C_4H_9$	548	11.16	-	-	-	diff. fl.	[732]	286
$Na + sec\text{-}C_4H_9Cl = NaCl + sec\text{-}C_4H_9$	548	11.36	-	-	-	diff. fl.	[732]	286
$Na + tert\text{-}C_4H_9Cl = NaCl + tert\text{-}C_4H_9$	548	11.52	-	0	7.8	diff. fl.	[732, 1569]	279
$Na + 1\text{-}iso\text{-}C_5H_{11}Cl = NaCl + 1\text{-}iso\text{-}C_5H_{11}$	503	12.33	-	0	5.4	diff. fl.	[733]	279
$Na + C_2H_5(CH_3)_2CCl = NaCl + C_2H_5(CH_3)_2C$	548	11.92	-	-	-	diff. fl.	[732]	286

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Na + (CH_3)_2CH(CH_2)_2Cl = NaCl + (CH_3)_2CH(CH_2)_2$	548	11.40	-	-	-	diff. fl.	[732]	286
$Na + CH_3(CH_2)_4Cl = NaCl + CH_3(CH_2)_4$	548	11.36	-	-	-	diff. fl.	[732]	286
$Na + CH_2CHCl = NaCl + C_2H_3$	548	10.66	-	0	10.4	diff. fl.	[732, 1569]	279
Na + cis-CHClCHCl = NaCl + C_2H_2Cl	548	11.45	-	-	-	diff. fl.	[732]	286
Na + trans-CHClCHCl = NaCl + C_2H_2Cl	548	11.29	-	-	-	diff. fl.	[732]	286
$Na + CH_2CCH_3Cl = NaCl + C_3H_5$	548	10.96	-	-	-	diff. fl.	[732]	286
$Na + CH_2CHCH_2Cl = NaCl + C_3H_5$	533	12.54	-	0	5.3	diff. fl.	[511]	286
	548	12.3	-	0	6.0	"	[732, 1569]	279
$Na + CH_3Br = NaBr + CH_3$	471-516	-	12.78	0	7.9	rare. fl.	[596]	287
	513	13.37	-	0	3.2	diff. fl.	[733, 514]	279, 280
	523	12.57	-	-	-	"	[717]	
	548	13.0	-	0	4.3	"	[732, 1569]	279
$Na + CH_2Br_2 = NaBr + CH_2Br$	523	13.47-13.58	-	-	-	diff. fl.	[717]	279
$Na + CHBr_3 = NaBr + CHBr_2$	523	14.55-13.90	-	-	-	diff. fl.	[717]	279
$Na + C_2H_5Br = NaBr + C_2H_5$	513	12.71-12.98	-	0	4.4	diff. fl.	[733]	279
	520	12.44	-	-	-	"	[1317]	
	536	12.70	-	0	4.9	"	[511]	286

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Na + CH_2BrCH_2Br = NaBr + C_2H_4Br$	520	13.3	-	-	-	-	[1524]	
$Na + CH_2CHBr = NaBr + C_2H_3$	542	12.36	-	0	5.8	diff. fl.	[511]	286
$Na + CH_3I = NaI + CH_3$	513	14.51	-	0	0.3	diff. fl.	[733, 514]	279
	523	13.66	-	-	-	"	[717]	"
	548	14.7	-	0	0	"	[732, 1569]	"
$Na + C_2H_5I = NaI + C_2H_5$	513–543	13.98	-	0	1.7	diff. fl.	[733]	279
	549	14.30	-	0	1.0	"	[511]	286
$Na + C_3H_7I\text{-}1 = NaI + C_3H_7$	513	13.32–13.59	-	0	3.0	diff. fl.	[733]	279
$Na + CH_2CHI = NaI + C_2H_3$	536	13.40	-	0	3.2	diff. fl.	[511]	286
$Na + CHF_2Cl = NaF + CHFCl$	500	10.0	-	-	-	-	[1524]	
$Na + CF_3Cl = NaCl + CF_3$	520	10.7	-	-	-	-	[1524]	
	583	10.89	-	0	10.2	diff. fl.	[888]	286
$Na + CF_2Cl_2 = NaCl + CF_2Cl$	583	11.50–11.66	-	0	9.0–9.5	diff. fl.	[888]	286
$Na + CFCl_3 = NaCl + CFCl_2$	583	11.79–11.96	-	0	8.7–9.2	diff. fl.	[888]	286
$Na + CHFBr_2 = NaBr + CHFBr$	528	13.68	-	-	-	diff. fl.	[717]	279
$Na + CFBr_3 = NaBr + CFBr_2$	523	13.96–14.34	-	-	-	diff. fl.	[717]	279

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Na + CH_2ClBr = NaBr + CH_2Cl$	523	13.27	-	-	-	diff. fl.	[717]	279
$Na + CHCl_2Br = NaBr + CHCl_2$	523	13.67-14.06	-	-	-	diff. fl.	[717]	279
$Na + CHClBr_2 = NaBr + CHClBr$	523	13.75-14.25	-	-	-	diff. fl.	[717]	279
$Na + CCl_3Br = NaBr + CCl_3$	523	13.98-14.47	-	-	-	diff. fl.	[717]	279
$Na + CF_3I = NaI + CF_3$	520	14.0	-	-	-	-	[1524]	
$Na + C_2N_2 = NaCN + CN$	533	~10.52	-	-	-	diff. fl.	[733]	
$Na + CNCl = NaCl + CN$	523	13.9	-	0	2.0	diff. fl.	[733]	279
	558	14.03	-	0	1.7	"	[511]	286
	573	13.6	-	-	-	"	[733]	
$Na + CNCl = NaCN + Cl$	573	13.0	-	-	-	diff. fl.	[733]	288
$Na + CNBr = NaBr + CN$	546	14.06	-	0	1.6	diff. fl.	[511]	286
$Na + CH_3CN = NaCN + CH_3$	520	<6.6	-	-	-	-	[1524]	
$Na + CH_2CNCl = NaCl + CH_2CN$	558	13.85_5	-	0	2.2	diff. fl.	[511]	286
$Na + CNCH_2CH_2Cl = NaCl + CNCH_2CH_2$	558	11.77	-	0	7.5	diff. fl.	[511]	286
$Na + C_2H_5OH = C_2H_5ONa + H$	570	12.78	-	0	4.2±0.3	diff. fl.	[1176]	280

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Na + n\text{-}C_3H_7OH = n\text{-}C_3H_7ONa + H$	570	11.79	-	0	7.0±0.2	diff. fl.	[1176]	280
$Na + iso\text{-}C_3H_7OH = iso\text{-}C_3H_7ONa + H$	570	12.40	-	0	5.3±0.5	diff. fl.	[1176]	280
$Na + HOCH_2CH_2Cl = NaCl + HOCH_2CH_2$	558	11.705	-	0	7.6	diff. fl.	[511]	286
$Na + CH_3OCH_2Cl = NaCl + CH_3OCH_2$	548	11.26	-	0	8.5	diff. fl.	[1569]	279, 289
$Na + CF_3COF = NaF + CF_3CO$	520	11.5	-	-	-	-	[1524]	
$Na + CF_3COOH = NaF + CF_2COOH$	520	13.0	-	-	-	-	[1524]	
$Na + CH_3COCl = NaCl + CH_3CO$	543	14.0	-	0	1.7	diff. fl.	[733]	279
	548	12.7	-	0	~5	"	[732, 1569]	"
	"	13.4	-	0	3.2	"	[1569]	279, 289
$Na + COCl_2 = NaCl + COCl$	543	13.93	-	-	-	diff. fl.	[754]	
$Na + CH_3COCH_2Cl = NaCl + CH_3COCH_2$	548	~13.7	-	0	~2.5	diff. fl.	[732, 1569]	279
	"	14.0	-	0	1.7	"	[1569]	279, 289
$Na + HOOCCH_2Cl = NaCl + HOOCCH_2$	520	13.3	-	-	-	-	[1524]	
$Na + C_2H_5OOCCl = NaCl + C_2H_5OOC$	520	11.6	-	-	-	-	[1524]	
	548	11.61	-	0	7.6	diff. fl.	[1569]	279, 289
$Na + C_2H_5O_2CCH_2Cl = NaCl + C_2H_5O_2CCH_2$	520	13.2	-	-	-	-	[1524]	
	548	13.14	-	0	3.8	diff. fl.	[1569]	279, 289

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Na + C_2H_5O_2CCH_2CN =$ $= NaCN + C_2H_5O_2CCH_2$	520	11.6	-	-	-	-	[1524]	
$Na + CH_3COBr = NaBr +$ $+ CH_3CO$	573	13.9	-	0	2.1	diff. fl.	[733]	279
$Na + C_6H_5F = NaF + C_6H_5$	520	<8.70	-	-	-	diff. fl.	[1317]	
$Na + C_6H_5Cl = NaCl +$	517	11.18	-	0	8.3	diff. fl.	[514]	
$+ C_6H_5$	520	9.36	-	-	-	"	[1317]	
	543	11.80	-	0	7.2	"	[733]	279
	554	11.42	-	0	8.25	diff. fl.	[514]	280, 286
	"	10.42	-	0	10.20	"	[1531]	290
$Na + C_6H_5CH_2Cl = NaCl +$	513	~14.7	-	0	0	diff. fl.	[733]	279
$+ C_6H_5CH_2$	548	~14.7	-	-	-	"	[732]	286
	557	13.73	-	0	2.5	"	[511]	"
$Na + C_6H_5CH_2CH_2Cl =$ $= NaCl + C_6H_5C_2H_4$	558	13.42	-	0	3.3	diff. fl.	[511]	286
$Na + C_6H_5CHCHCl =$ $= NaCl + C_6H_5CHCH$	548	12.98	-	0	4.3	diff. fl.	[511]	286
$Na + C_6H_5CHCHCH_2Cl =$ $= NaCl + C_6H_5CHCHCH_2$	548	13.89	-	0	2.0	diff. fl.	[511]	286
$Na + C_6H_5Br = NaBr +$	496	13.17	-	-	-	diff. fl.	[514]	286
$+ C_6H_5$	517	13.21	-	0	3.52	"	"	280, 286
	"	12.78	-	0	4.55	"	[1531]	290
	520	11.41_5	-	-	-	diff. fl.	[1317]	
	"	11.4	-	0	7.8	-	[1524]	291
	528 and 603	-	13.87	0	3.8	diff. fl.	[1568]	
	533	13.4	-	0	3.1	diff. fl.	[733]	279

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Na + C_6H_5CH_2CH_2Br =$ $= NaBr + C_6H_5C_2H_4$	553	13.57	–	0	2.8	diff. fl.	[511]	286
$Na + C_6H_5CHCHBr = NaBr +$ $+ C_6H_5CHCH$	543	13.06	–	0	4.1	diff. fl.	[511]	286
$Na + C_6H_5CHCHCH_2Br =$ $= NaBr + C_6H_5CHCHCH_2$	558	14.64	–	0	0.2	diff. fl.	[511]	286
$Na +$ ortho-$CH_3C_6H_4Br =$ $= NaBr + CH_3C_6H_4$	520	11.49	–	–	–	diff. fl.	[1317]	
	"	11.5	–	0	7.6	"	[1524]	291
$Na +$ meta-$CH_3C_6H_4Br =$ $= NaBr + CH_3C_6H_4$	520	11.20	–	–	–	diff. fl.	[1317]	
	"	11.2	–	0	8.3	"	[1524]	291
$Na +$ para-$CH_3C_6H_4Br =$ $= NaBr + CH_3C_6H_4$	520	11.25	–	–	–	diff. fl.	[1317]	
	"	11.3	–	0	8.2	"	[1524]	291
$Na + C_6H_5J = NaJ +$ $+ C_6H_5$	500	14.31	–	0	0.855	diff. fl.	[514]	286
	"	13.95	–	0	1.74	"	[1531]	290
	513	~14.7	–	0	0	"	[733]	279
$Na +$ α-bromonaphthalene $=$ $= NaBr + C_{10}H_7$	520	12.7	–	–	–	–	[1524]	
$Na +$ β-bromonaphthalene $=$ $= NaBr + C_{10}H_7$	520	12.1	–	–	–	–	[1524]	
$Na +$ ortho-$FC_6H_4Cl =$ $= NaCl + FC_6H_4$	520	10.32	–	–	–	diff. fl.	[1317]	
	"	10.3	–	0	10.4	"	[1524]	291
$Na +$ meta-$FC_6H_4Cl =$ $= NaCl + FC_6H_4$	520	9.78_5	–	–	–	diff. fl.	[1317]	
	"	9.8	–	0	11.7	"	[1524]	291
$Na +$ para-$FC_6H_4Cl =$ $= NaCl + FC_6H_4$	520	9.11	–	–	–	diff. fl.	[1317]	
	"	9.0	–	0	13.0	"	[1524]	291

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
Na + ortho-ClC_6H_4Cl = = $NaCl + C_6H_4Cl$	520	11.18	-	-	-	diff. fl.	[1317]	
Na + ortho-BrC_6H_4Br = = $NaBr + C_6H_4Br$	520	13.35	-	-	-	diff. fl.	[1317]	
Na + ortho-ClC_6H_4Br = = $NaBr + C_6H_4Cl$	520	12.59	-	-	-	diff. fl.	[1317]	
	"	12.6	-	0	5.0	-	[1524]	291
Na + meta-ClC_6H_4Br = = $NaBr + C_6H_4Cl$	520	11.92	-	-	-	diff. fl.	[1317]	
	"	11.9	-	0	6.6	-	[1524]	291
Na + para-ClC_6H_4Br = = $NaBr + C_6H_4Cl$	520	11.62	-	-	-	diff. fl.	[1317]	
	"	11.6	-	0	11.8	-	[1524]	291
Na + $C_6H_5CH_2CN$ = $NaCN$+ + $C_6H_5CH_2$	520	9.8	-	-	-	-	[1524]	
Na + ortho-CNC_6H_4Br = = $NaBr + CNC_6H_4$	520	13.82	-	-	-	diff. fl.	[1317]	
	"	13.3	-	0	3.3	"	[1524]	291
Na + meta-CNC_6H_4Br = = $NaBr + CNC_6H_4$	520	12.56	-	-	-	diff. fl.	[1317]	
	"	12.6	-	0	5.0	"	[1524]	291
Na + para-CNC_6H_4Br = = $NaBr + CNC_6H_4$	520	12.80	-	-	-	diff. fl.	[1317]	
	"	12.8	-	0	4.4	"	[1524]	291
Na + ortho-HOC_6H_4Br = = $NaBr + HOC_6H_4$	520	12.20_6	-	-	-	diff. fl.	[1317]	
	"	12.2	-	0	6.0	"	[1524]	291
Na + meta-HOC_6H_4Br = = $NaBr + HOC_6H_4$	520	11.82	-	-	-	diff. fl.	[1317]	
	"	11.8	-	0	6.9	"	[1524]	291,1676
Na + ortho-$CH_3OC_6H_4Br$ = = $NaBr + CH_3OC_6H_4$	520	11.90	-	-	-	diff. fl.	[1317]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
Na + para-$CH_3OC_6H_4Br$ = = NaBr + $CH_3OC_6H_4$	520	11.57	-	-	-	diff. fl.	[1317]	
Na + C_6H_5COCl = NaCl + + C_6H_5CO	513	~14.7	-	0	0	diff. fl.	[733]	279
Na + ortho-$CH_3OOCC_6H_4Cl$ = = NaCl + $CH_3OOCC_6H_4$	520	13.41_6	-	-	-	diff. fl.	[1317]	
Na + ortho-$CH_3OOCC_6H_4Br$ = = NaBr + $CH_3OOCC_6H_4$	520	13.78	-	-	-	diff. fl.	[1317]	
	"	13.8	-	0	2.2	"	[1524]	291
Na + meta-$CH_3OOCC_6H_4Br$ = = NaBr + $CH_3OOCC_6H_4$	520	12.6	-	-	-	diff. fl.	[1317]	
	"	12.6	-	0	5.0	"	[1524]	291
Na + para-$CH_3OOCC_6H_4Br$ = = NaBr + $CH_3OOCC_6H_4$	520	12.6	-	-	-	diff. fl.	[1317]	
	"	12.6	-	0	5.0	"	[1524]	291
Na + 2-Cl-pyridine = = NaCl + C_5H_4N	520	12.68	-	-	-	diff. fl.	[1317]	
Na + 3-Cl-pyridine = = NaCl + C_5H_4N	520	10.04	-	-	-	diff. fl.	[1317]	
Na + 2-Br-pyridine = = NaBr + C_5H_4N	520	13.27	-	-	-	diff. fl.	[1317]	
Na + 3-Br-pyridine = = NaBr + [illegible]N	520	11.87	-	-	-	diff. fl.	[1317]	
Na + meta-C_6H_4Br-pyridine = Na Br + C_6H_4-pyridine	520	11.8	-	0	6.7	-	[1524]	291
Na + ortho-C_6H_4Br-pyridine = NaBr + C_6H_4-pyridine	520	13.3	-	0	3.4	-	[1524]	291

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Na + N_2O = NaO + N_2$	535	13.06_4	-	0	3.8	diff. fl.	[128]	280
$Na + NO_2 = NaO + NO$	525	13.60_6	-	0	2.4	diff. fl.	[128]	280
$Na + CH_3NO_2 = NaO + CH_3NO$	528	13.66	-	0	2.3	diff. fl.	[128]	280
$Na + C_2H_5NO_3 = NaO + C_2H_5ONO$	527	13.62	-	0	2.35	diff. fl.	[128]	280
$Na + C_5H_{11}ONO = NaO + C_5H_{11}ON$	524	13.50	-	0	2.8	diff. fl.	[128]	280
$Na + HgCl = NaCl + Hg$	-	14.3	-	-	-	rare. fl.	[1208]	
$Na + HgCl_2 = NaCl + HgCl$	-	15.48	-	-	-	rare. fl.	[1208]	
$Na + BCl_3 = NaCl + BCl_2$	543	11.67	-	-	-	diff. fl.	[754]	
$Na + BBr_3 = NaBr + BBr_2$	543	13.39	-	-	-	diff. fl.	[754]	
$Na + SiCl_4 = NaCl + SiCl_3$	543	11.60_6	-	-	-	diff. fl.	[754]	
$Na + SiBr_4 = NaBr + SiBr_3$	543	14.16	-	-	-	diff. fl.	[754]	
$Na + GeCl_4 = NaCl + GeCl_3$	543	14.69	-	-	-	diff. fl.	[754]	
$Na + SnCl_4 = NaCl + SnCl_3$	543	14.545	-	-	-	diff. fl.	[754]	
$Na + TiCl_4 = NaCl + TiCl_3$	543	14.0	-	-	-	diff. fl.	[754]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Na + PCl_3 = NaCl + PCl_2$	543	14,18	–	–	–	diff. fl.	[754]	
$Na + AsCl_3 = NaCl + AsCl_2$	543	14,17	–	–	–	diff. fl.	[754]	
$Na + SF_6 = NaF + SF_5$	520	13,3	–	–	–	–	[1524]	
$Na + SCl_2 = NaCl + SCl$	543	14,80	–	–	–	diff. fl.	[754]	
$Na + S_2Cl_2 = NaCl + S_2Cl$	543	$14{,}24_4$	–	–	–	diff. fl.	[754]	
$Na + POCl_3 = NaCl + POCl_2$	543	14,36	–	–	–	diff. fl.	[754]	
$Na + CrO_2Cl_2 = NaCl + CrO_2Cl$	543	14,12	–	–	–	diff. fl.	[754]	
$Na + NO = NaNO$	533	11,0	–	–	–	therm.	[129]	
$Na + NO + N_2 = NaNO + N_2$	533	17,0	–	–	–	therm.	[129]	
$Na + O_2 = NaO_2$	533	12,3	–	–	–	therm.	[129]	
$Na + O_2 + He = NaO_2 + He$	523	18,28	–	–	–	therm.	[702]	
$Na + O_2 + Ar = NaO_2 + Ar$	523	18,08	–	–	–	therm.	[702]	
$Na + O_2 + N_2 = NaO_2 + N_2$	523	18,20	–	0	–7	therm.	[702]	
	533	18,22	–	–	–	"	[129]	
	673	17,61	–	–	–	"	[702]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Na + O_2 + M = NaO_2 + M$	1400-1700	~14.5	-	-	-	fl.	[881]	292
	1420-1600	14.47	-	-	-	"	[316]	
$Na + CS_2 + C_3H_8 = NaCS_2 + C_3H_8$	543	~9.5	-	-	-	diff. fl.	[754]	293
$K + HCl = KCl + H$	600	14.4	-	-	-	rare. fl.	[1363]	294
$K + HBr = KBr + H$	600	15.0	-	-	-	rare. fl.	[1363]	294
$K + HI = KI + H$	600	15.76	-	-	-	rare. fl.	[1363]	295
$K + O_2 + M = KO_2 + M$	1400-1700	~14.5	-	-	-	fl.	[881]	292
	1420-1600	14.57	-	-	-	"	[316]	
$Cs + O_2 + M = CsO_2 + M$	1420-1600	4.88	-	-	-	fl.	[316]	
$Zn + Cl_2 = ZnCl + Cl$	573	-	-	0	9.7	rare. fl.	[1248]	
$Cd + Cl_2 = CdCl + Cl$	573	-	-	0	12.5	rare. fl.	[1248]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$N + H_2 = NH + H -$	293-623	$\angle$ 14.7	-	-	-	dis.	[1537]	
$- 20\pm3$	300	$\angle$ 8	-	0	$\geq$ 15	est.	[1286]	
$N + N_2 = NN + N$	3400	11.48	-	-	-	shock	[104]	
$N + O_2 = NO + O +$	300	6.78 ± 0.5	-	-	-	radiol.	[726]	296
$+ 32.0$	300-910	-	13.15 ± 0.02	0	7.9 ± 0.2	dis. , EPR	[1622]	
	"	-	11.47_7	1/2	7.13	"	"	
	350	7.7	-	-	-	dis. , flow	[965]	
	394-517	-	12.30	0	6.2	"	[938]	297
	412-755	-	12.92 ± 0.05	0	7.1 ± 0.4	"	[388, 398, 384]	
	423-623	-	12.36	0	5.9	"	[1066]	
	453-603	-	12.58	0	7.0	dis. , flow	[1552]	
	1170-1530	-	13.58	0	8.0	therm. , from k_ and K	[899]	
	1575-1663	-	13.23	0	7.5	therm.	[894]	
	3400-7500	-	10.12	1	7.074	shock	[1015,1016]	
	900-3000	-	11.155	1/2	6.2	-	[1134]	298
	300-3000	-	13.00 ± 0.09	0	7.50 ± 0.20	-	-	299
$N + Cl_2 = NCl + Cl$	291	8.24	-	-	-	act. N_2	[689]	300
	328	8.40_2	-	-	-	"	"	
$N + Br_2 = NBr + Br$	291	9.31	-	-	-	act. N_2	[689]	301
	328	9.46	-	-	-	"	"	
$N + I_2 = NI + I$	283-323	-	10.19 ± 0.05	0	$0.068\pm$ ±0.034	act. N_2	[1240]	302
	288-308	10.75	-	-	-	"	[583]	
$N + ICl = NI + Cl$ or	291	8.16	-	-	-	act. N_2	[689]	
$NCl + I$	328	7.89	-	-	-	"	"	
$N + IBr = NI + Br$ or	291	9.86	-	-	-	dis. , flow	[689]	
$NBr + I$	328	9.92	-	-	-	"	"	
$N + HCl = ?$	323-718	-	-	-	-	dis. , flow	[1612]	303

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
N + HBr = NH + Br	313	10.36	-	-	-	dis. , flow	[1124]	
N + ClO = NO + Cl	room?	$\leq$ 10.48	-	-	-	dis. , flow	[585]	
N + Cl_2O = NCl + ClO	room?	11.95±0.07	-	-	-	dis. , flow	[585]	
N + OH = NO + H	room	> 12.78	-	-	-	dis. , flow	[605]	
	320	13.56±0.01	-	-	-	act. N_2	[311]	304
	-	-	11.7	1/2	5	est.	[1288]	305
N + HO_2 = NH + O_2	350	> 11	-	-	-	dis. , flow	[965]	
N + NO = N_2 + O + 75.0	room	> 12.38	-	-	-	dis. , flow	[1546]	
	298	$\geq$11.60	-	-	-	"	[938]	
	"	12.94±0.24	-	-	-	"	[758]	
	"	13.09±0.14	-	-	-	"	[1241]	
	"	$\geq$13.70	-	-	-	"	[939]	306
	300	11.28±0.5	-	-	-	radiol.	[726]	296
	476 - 755	-	13.47±0.09	0	0.2±0.7	dis. , flow	[388,389,384]	
	1525 - 1912	-	-	-	-	therm.	[1550]	307
	1600	-	-	-	-	therm. , stat.	[894]	308
	3400 - 7500	-	13.20	0	0	shock	[1015,1016]	309
	298 - 1912	-	13.44	0	0.5	-	-	310
N + N_2O = NO + N_2 + + 186.4	room	> 13.70	-	-	-	dis. , flow	[939]	
N + NO_2 = products (total reaction)	room	13.04±0.05	-	-	-	dis. , flow	[1244]	311
	500	12.69±0.04	-	-	-	"	[1546]	
N + NO_2 = N_2O + O + 42	293 - 708	-	-	-	-	dis. , flow	[385]	312
	room	12.67±0.09	-	-	-	"	[1244]	313,314
	> 300	10.25±0.3	-	-	-	rad. -chem.	[726,727]	296
N + NO_2 = 2 NO + 78.2	293 - 708	-	-	-	-	dis. , flow	[385]	312
	room	12.55±0.14	-	-	-	"	[1244]	314,315
	> 300	10.48±0.5	-	-	-	rad. -chem.	[726,727]	296
N + NO_2 = N_2 + O_2 + + 121.2	room	< 12.43	-	-	-	dis. , flow	[1244]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$N + NO_2 = N_2 + 2\ O +$ $+ 3.2$	room	11.83 ± 0.59	-	-	-	dis., flow	[1244]	313,314
	> 300	10.08 ± 0.3	-	-	-	rad.-chem.	[726, 727]	296
$N + N_2O_5 = ?$	room	< 8.8	-	-	-	dis.	[1023]	
$N + HNO = N_2O + H$	-	-	10.7	1/2	3	est.	[1288]	
$N + HNO = NH + NO$	-	-	11	1/2	2	est.	[1288]	
$N + CO_2 = NO + CO + 24$	291 - 523	-	11.28 ± 0.06	0	3.4 ± 0.3	dis., flow	[1688]	
$N + CO_2 = ?$	550	≤ 8	-	-	-	dis., flow	[764]	316
$N + O_3 = NO + O_2 +$ $+ 126.1$	298	11.52 ± 0.11	-	-	-	dis., flow	[1241]	317
	"	> 10.0	-	-	-	"	[336]	
$N + CH_3 = HCN + 2H$ or $HCN + H_2$	323 - 673	-	-	0	0.5 ± 0.4	dis., flow	[34]	
$N + CH_4 \rightarrow (N.CH_4) \rightarrow$ $\rightarrow HCN + H_2 + H$	500	≤ 9.6	-	-	-	dis., flow	[765]	
	545 - 719	-	10.76	1/2	11	"	[178]	
$N + C_2H_6 = ?$	273 - 403	-	9.72	0	1.7	act. N_2	[867]	318
	279 - 568	-	11.16 ± 0.7	1/2	7 ± 1	dis., flow	[178]	319
	403 - 703	-	12.36	0	7.0	act. N_2	[867]	
$N + C_3H_8 = HCN + H_2 +$ $+ C_2H_5$	336 and 523	-	11.98 ± 0.67	0	5.6 ± 0.6	dis., flow	[1205]	
$N + C_3H_8 = NH +$ $+ CH_3CHCH_3$	273 - 623	-	12.72	0	5.5	act. N_2	[867]	
$N + n\text{-}C_4H_{10} = HCN +$ $+ H_2 + C_3H_7$	348 and 523	-	10.25	0	3.6	dis., flow	[73]	
$N + iso\text{-}C_4H_{10} = HCN +$ $+ H_2 + C_3H_7$	373 and 533	-	10.20	0	3.1	dis., flow	[73]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$N + (CH_3)_4C$ = ?	273 - 388	-	9.46	0	1.5	act. N_2	[867]	318
	388 - 724	-	12.14	0	6.6	"	"	
$N + C_2H_4 = HCN + CH_3$	273 - 378	-	11.09 ± 3.75	0	0.915 ± 0.950	diff. fl.	[676]	321
	291 - 523	-	11.32 ± 0.06	0	1.8 ± 0.2	dis., flow	[1689]	
	295	10.32	-	-	-	diff. fl.	[676]	
	room	10.25	-	-	-	dis.	[579]	
	295 - 672		10.32 ± 0.04	0	0.4 ± 0.2	act. N_2	[1004]	
	313	10.99 ± 0.09	-	-	-	diff. fl.	[1124]	
	"	10.18	-	-	-	dis., flow	[1033]	
	318	9.73	-	-	-	"	[1219]	
	320	≤ 9.84	-	-	-	"	[760]	
	325	~ 10.6	-	-	-	diff. fl.	[675]	
	338 - 697	-	10.2	0	0.7	dis.	[1219]	
	340	$\sim 9.94 \pm 0.24$	-	-	-	dis., flow	[761]	322
	423	9.79	-	-	-	"	[1640]	323
	"	10.25	-	-	-	"	"	324
	473 - 601	10.76	-	-	-	"	[757]	325
$N + CHD_3$ = ?	320 - 550	-	$10.42_5 \pm 0.21$	0	0.76 ± 0.38	dis., flow	[765]	
$N + C_2D_4 = DCN + CD_3$	room?	11.23	-	-	-	act. N_2	[579]	
$N + C_3H_6 = HCN + C_2H_4 + H$	313	10.40	-	-	-	dis., flow	[1033]	
	338 - 697	-	11.18	0	1.65	dis.	[1219]	326
	340	10.26 ± 0.14	-	-	-	dis., flow	[761]	327
$N + C_3D_6 = DCN + C_2D_4 + D$	320 - 550	-	10.95 ± 0.15	0	1.02 ± 0.27	dis., flow	[765]	
$N + C_4H_8\text{-}1$ = ?	320 - 550	-	11.19 ± 0.13	0	1.31 ± 0.23	dis., flow	[765]	
$N + C_4H_8\text{-}1 = [C_4H_7N] + H$?	340	10.29 ± 0.09	-	-	-	dis., flow	[761]	327
$N + (CH_3)_2CCH_2 = [C_4H_7N] + H$?	340	10.61 ± 0.11	-	-	-	dis., flow	[761]	327
$N + iso\text{-}C_4H_8$ = ?	320 - 550	-	10.89 ± 0.15	0	0.55 ± 0.27	dis., flow	[765]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
N + cis-C_4H_8-2 = ?	320 - 550	-	11.37±0.08	0	1.98±0.15	dis., flow	[765]	
N + trans-C_4H_8-2 = = [C_4H_7N] + H?	340	10.22±0.11	-	-	-	dis.	[761]	327
N + trans-C_4H_8-2 = ?	320 - 550	-	11.52_5±0.07	0	2.10± ±0.12_5	dis., flow	[765]	
N + $(CH_3)_2CCHCH_3$ = ?	320 - 550	-	10.97±0.14	0	0.86±0.25	dis. flow	[765]	
N + $(CH_3)_2CC(CH_3)_2$ = = [$C_6H_{11}N$] + H?	340	10.37±0.12	-	-	-	dis., flow	[761]	327
N + $(CH_3)_2CC(CH_3)_2$ = ?	320 - 550	-	11.23±0.10	0	1.37±0.17	dis., flow	[765]	
N + $CH_2CHCHCH_2$ = = [C_4H_5N] + H?	340	10.52±0.13	-	-	-	dis., flow	[761]	327
N + cyclo-C_3H_6 = HCN + + H_2 + C_2H_3	323 - 623	-	10.06	0	3.2	act. N_2	[940]	
N + cyclo-C_4H_8 = HCN + + H_2 + C_3H_5	333 and 523	-	11.3	0	4.9	act. N_2	[940]	
N + cyclo-C_5H_{10} = HCN+ + H_2 + C_4H_7	383 and 543	-	11.4	0	5.3	act. N_2	[940]	
N + C_6H_6 = ?	500	≤ 9.6	-	-	-	dis., flow	[765]	
N + CH_3OH → $N.CH_3OH$→ → CH_3N + OH	303 - 755 "	- -	9.99 10.20	1/2 1/2	3.0 3.2	dis., flow "	[1419] "	 328
N + C_2H_5OH = C_2H_5N + + OH	300 - 593	-	12.08	0	3.4	dis., flow	[603]	
N + iso-C_3H_7OH = = iso-C_3H_7N + OH	300 and 593	-	11.84	0	2.6	dis., flow	[603]	
N + CH_3CHO = HCN + H_2+ + HCO	296	10.07_5± ±0.05_5	-	-	-	dis., flow	[978]	
N + CH_3CN = 2 HCN + H	433 - 733	-	9.17	0	1.7	dis. flow, N_2	[577]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$N + (CH_3N)_2 = HCN + H_2 + N_2 + CH_3$	323-673	-	-	0	1.9±0.3	dis., flow	[34]	
$N + CH_3F = ?$	500	≤ 9.6	-	-	-	dis., flow	[765]	
$N + CH_3Cl = ?$	500	≤ 9.6	-	-	-	dis., flow	[765]	
$N + C_2HCl_3 = ?$	500	≤ 9.6	-	-	-	dis., flow	[765]	
N + trans-2-C_4F_8 = ?	500	≤ 9.6	-	-	-	dis., flow	[765]	
$N + C_4F_8$-2 = ?	298	10.69±0.17	-	-	-	m.-w. dis., flow	[1033]	
	313	10.50±0.13	-	-	-	cond. dis., flow	"	
$N + N \rightarrow N_2^{\prime} \rightarrow N_2 + h\nu$	room	7.27	-	-	-	dis., flow	[1657]	329
$N + N + He = N_2 + He$	297	14.61	-	-	-	dis., flow	[762, 763]	
	298	15.28±0.04	-	-	-	"	[309, 313]	330
$N + N + Ne = N_2 + Ne$	300	16.3	-	-	-	-	[325]	331
$N + N + Ar = N_2 + Ar$	196 - 327	-	14.477	0	$\mp 0.975 \pm 0.14$	dis., flow	[313]	
	"	-	$20.07_5 \pm 1$	$\mp 2.0 \pm 0.4$	0	"	"	
	293	15.24	-	-	-	dis., flow	[309]	
	297	15.14±0.05	-	-	-	"	[762,763]	
	298	15.14±0.04	-	-	-	"	[313]	
	300	16.0	-	-	-	-	[325]	331
	5600	15.43	-	-	-	shock	[301]	
	6000	15.95	-	-	-	"	"	
	6000 - 9000	-	16.00	-1/2	0	shock from k_- and K	[276]	332
	6400	15.00	-	-	-	shock	[301]	
	"	14.36	-	-	-	-	[325]	333
	8000 - 15000	-	19.92	-1.6	0	shock	[32]	
	300 - 6400	-	16.42	-1/2	0	-	-	334
$N + N + Xe = N_2 + Xe$	300	17.71	-	-	-	-	[498]	
	6400	15.43	-	-	-	shock	"	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$N + N + N = N_2 + N$	300	16.43	-	-	-	-	[325]	331
	6000 - 9000	-	21.38	-3/2	0	shock	[276]	332
	6400	15.79 ± 0.15	-	-	-	"	[16]	
	"	15.50	-	-	-	"	[325, 276]	332
	8000 - 15000	-	20.96 ± 0.17	-1.6	0	"	[32]	
$N + N + O = N_2 + O'(^1S)$	room	14.56	-	-	-	dis., flow	[1655]	
$N + N + H_2 = N_2 + H_2$	196	$15.76_5 \pm 0.07_5$	-	-	-	act. N_2	[311]	
$N + N + N_2 = N_2 + N_2$	90 - 611	-	-	-	-	dis.	[381]	
	90 - 6400	-	14.7	0	-1 ± 0.8	-	"	336
	196	$15.51_5 \pm 0.15$	-	-	-	act. N_2	[311]	
	196 - 327	-	14.477	0	$-0.97_5 \pm 0.14_5$	dis., flow	[313]	
	"	-	$20.07_5 \pm 1$	-2.0 ± 0.4	0	"	"	
	273 - 453	15.45 ± 0.06	-	-	-	dis., flow	[763]	335
	293	15.14	-	-	-	dis.	[309]	337
	293 - 573	15.71	-	-	-	dis., flow	[1686]	
	295	15.71 ± 0.07	-	-	-	dis., flow	[1067]	
	room	15.91 ± 0.04	-	-	-	dis., EPR	[512]	
	"	15.78	-	-	-	dis.	[1580]	
	"	15.64	-	-	-	dis., flow	[491]	
	297	15.08	-	-	-	"	[978]	
	298	15.14 ± 0.04	-	-	-	"	[313]	
	300	15.79	-	-	-	"	[729]	
	"	14.89	-	-	-	"	[965]	
	"	15.2	-	-	-	"	[324, 512]	
	"	15.43	-	-	-	"	[1055]	338
	"	15.05	-	-	-	calc.	[965]	
	"	15.4	-	-	-	dis., flow	[105]	
	"	17.59	-	-	-	-	[325]	331
	"	14.92	-	-	-	dis., flow	[965]	
	328	14.50 ± 0.13	-	-	-	"	[909]	
	"	14.80 ± 0.13	-	-	-	"	"	339
	350	14.92	-	-	-	"	[965]	
	673	15.9 ± 0.3	-	-	-	"	[71, 909]	
	"	15.28 ± 0.09	-	-	-	"	[909]	
	"	15.59 ± 0.10	-	-	-	"	"	339

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	973	16.67±0.06	-	-	-	dis., flow	[71]	
	3400 - 7500	-	20.30	-3/2	-	-	[1016]	
	6000 - 9000	-	16.42	-1/2	-	shock	[276,1015]	340,341,332
	6400	14.68±0.15	-	-	-	"	[16]	
	"	14.71	-	-	-	"	[325,276]	
	8000 - 15000	-	$20.39_5\pm$ $\pm 0.11_5$	-1.6	0	"	[32]	
	300 - 9000	-	16.30±0.36	-0.47 ±0.13	-	-	-	342
$N + N + N_2 = N_2 +$ $+ N_2'(^5\Sigma)$?	room	14.86	-	-	-	dis., flow	[160]	329
$N + N + N_2 = N_2(B^3\Pi g) +$ $+ N_2$	293	14.70	-	-	-	dis.	[309]	343,329
	room	14.86	-	-	-	dis., flow	[160]	
$N + N + H_2O = N_2 + H_2O$	298	15.56±0.10	-	-	-	act. N_2	[312]	344
$N + N + CO_2 = N_2 + CO_2$	196	15.53±0.05	-	-	-	act. N_2	[312]	
	196	15.995± ±0.035	-	-	-	dis.	[310]	
	298	15.405± ±0.085	-	-	-	dis.	[310]	
$N + N + N_2O = N_2 + N_2O$	196	15.46±0.06	-	-	-	act. N_2	[312]	
	"	15.55±0.05	-	-	-	dis.	[310]	
	298	15.34±0.06	-	-	-	"	"	
$N + N + CH_3CN = N_2 +$ $+ CH_3CN$	433-733	-	14.55	0	-4.5	dis., N_2, flow	[577]	
$N + N + M = N_2 + M$	3400-7500	-	16.04	-1/2	0	shock	[1015, 1016]	345
$N + O = NO' = NO + h\nu$	room	7.06	-	-	-	dis., flow	[1657]	
$N + O \rightarrow NO' \rightarrow NO +$ $+ h\nu\ (\gamma)$	300	6.85	-	-	-	dis.	[691]	
	300-1300	-	7.72	-0.35	0	shock, dis.	"	
$N + O \rightarrow NO' \rightarrow NO +$ $+ h\nu\ (\delta)$	300	6.61	-	-	-	dis.	[691]	
	300-1300	-	7.48	-0.35	0	shock, dis.	"	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$N + O = NO'(C^2\Pi) \rightarrow$ $\rightarrow NO + h\nu$	293	8.49	-	-	-	photol.	[291]	346
$N + O + O = NO + O'(^1S)$	room	15.03	-	-	-	dis., flow	[1655]	
$N + O + He = NO + He$	room	15.13±0.05	-	-	-	dis.	[1493]	
$N + O + Ar = NO + Ar$	room	15.47±0.05	-	-	-	dis.	[1493]	
$N + O + H_2 = NO + H_2$	196	16.04±0.04	-	-	-	act. N_2	[311]	
$N + O + N_2 = NO + N_2$	196	15.68±0.08	-	-	-	act. N_2	[311]	
	295	15.26	-	-	-	dis.	[1067]	347
	300	15.27_5	-	-	-	calc.	[965]	
	"	15.76	-	-	-	dis., flow	[105]	
	350	15.52	-	-	-	"	[965]	348
$N + O + N_2 = NO'$ $+ N_2$	room	13.56	-	-	-	dis., flow	[1655]	
$N + O + N_2 \rightarrow NO' +$ $+ N_2 \rightarrow NO + N_2 +$ $+ h\nu\ (\gamma)$	300	13.88	-	-	-	dis.	[691]	
	300 - 1300	-	16.95_5	-1.24	0	shock, dis.	"	
$N + O + N_2 \rightarrow NO' +$ $+ N_2 \rightarrow NO + N_2 +$ $+ h\nu\ (\beta)$	300	14.05	-	-	-	dis.	[691]	
	300 - 1300	-	17.52	-1.4	0	shock, dis.	"	
$N + O + H_2O = NO + H_2O$	298	16.41±0.03	-	-	-	act. N_2	[312]	
$N + O + CO_2 = NO + CO_2$	196	16.17±0.03	-	-	-	act. N_2	[312]	
	"	15.93±0.04	-	-	-	dis.	[310]	
	298	15.81±0.03	-	-	-	"	"	
$N + O + N_2O = NO + N_2O$	196	16.04±0.04	-	-	-	act. N_2	[312]	
	"	15.89_5±0.02_5	-	-	-	dis.	[310]	
	298	15.73±0.03	-	-	-	"	"	
$N + O + M = NO + M$	room	15.26±0.05	-	-	-	dis., flow	[1067]	349
	3400 - 7500	-	21.30	-3/2	-	-	[1016]	350
	"	-	20.00	-1/2	-	-	"	351

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
N + O + M = NO' + M = = NO + M + hν	room	9.97	-	-	-	dis. , flow	[1657]	
$N + H_2 + N_2 = NH_2 + N_2$	291 - 523	15.56±0.5	-	0	0	dis. , flow	[1690]	
$N + CN + N_2 = NCN + N_2$	293	15.74±0.08	-	-	-	dis. , flow	[1389,308]	
$N + C_2H_2 \rightarrow C_2H_2N$	291 - 523	-	10.28±0.04	0	2.7±0.2	dis.	[1687]	352
	"	-	8.75	1/2	2.3±0.2	"	"	
$N + C_2H_2$ = ?	330 - 550	<9.3	-	-	-	dis. , flow	[765]	
N + propyne = ?	320 - 550	-	10.84±0.15	0	1.48±±0.28	dis. , flow	[765]	
N + 1-butyne = ?	320 - 550	-	11.54±0.11	0	2.24±±0.21	dis. , flow	[765]	
N + 2-butyne = ?	320 - 550	-	11.26_5±0.13	0	1.84±±0.25	dis. , flow	[765]	
N + 1-pentyne = ?	320 - 550	-	11.47±0.16	0	2.08±±0.30	dis. , flow	[765]	
N + 1-hexyne = ?	320 - 550	-	11.66±0.13	0	2.45±±0.24	dis. , flow	[765]	
N + 3-hexyne = ?	320 - 550	-	11.53±0.12	0	2.19±±0.22	dis. , flow	[765]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + H_2 = OH + H - 1.9 \pm 0.3$	room	7.45±0.15	-	-	-	dis., flow NO_2 tit.	[1889]	
	320	7.08±0.04	-	-	-	act. N_2	[311]	
	320 - 1750	-	13.0	0	8.8±0.4	-	"	354
	357	8.32±0.02	-	-	-	N(dis.)+NO, EPR	[1586]	
	373 - 478	-	13.11_4	0	9.4±0.15	dis., N + + NO, EPR	[806]	
	400 - 600	-	13.63	0	10.2	dis., flow	[1632,1631]	353
	400 - 1667	-	13.51	0	10.0	shock	[700]	355
	409 - 733	-	13.08	0	9.2±0.6	dis.	[387,371]	
	"	-	11.56	1/2	8.9±0.7	"	[394]	
	409 - 928	-	13.60±0.04	0	10.2±0.5	dis., flow "$N+NO = N_2+O$"	[1584]	
	773 - 823	-	-	-	~9.2	fl. lim., ignit.	[78]	
	793	10.30	-	-	-	fl. lim., low	[78]	
	793 - 1815	-	12.40±0.7	0	7,7±1.0	fl.	[537,1283]	356
	840 - 930	-	13.73	0	11.7±0.7	"	[1700,1699]	
	850 - 1000	-	13.25	0	8.2	H_2 combust.	[972]	
	960 - 1080	-	13.08	0	9,2	comp.	[78,537,1700, 1408,387]	32
	975 - 2060	-	13.748	0	10,2	shock	[699]	357
	993	11.23±0.15	-	-	-	fl., EPR	[1707]	
	1000 - 1700	-	13.7	0	10.0	comp.	[248]	
	1200 - 1600	-	13.08	0	8.95	"	[138]	
	1400 - 2500	-	13.08	0	9.2	"	[1326]	
	1400 - 3000	-	13.78	0	10,0	shock	[247]	
	1500	12.296	-	-	-	"	[699]	357
	1660	11.39±0.07	-	-	-	fl.	[537]	
	1815	$11.47_5 \pm 0.04_5$	-	-	-	"	"	
	373 - 1667	-	13.39±0.07	0	9.84±0.17	-	-	358
$O + D_2 = OD + D$	416 - 968	-	13.26±0.18	0	11.0±0.5	N(dis.) + + NO, EPR	[1586]	
	850 - 1000	-	13.10	0	10.4	D_2 combust.	[972]	
	400 - 1000	-	13.24±0.02	0	10.96±0.06	-	-	359
$O + OH = O_2 + H + 16.6$	265 and 293	13.45±0.15	-	-	-	dis., flow	[394,371,391]	360
	300	13.44±0.18	-	-	-	"	[450,892,895]	"
	300 - 2000	-	13.75±0.3	0	1.0 ± 0.5	est.	[895]	362
	310	13.01±0.17	-	-	-	dis., flow	"	360
	960 - 1080	-	13.79	0	1.19	comp.	[1408]	20

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	293–1650	-	11.30	1/2	0±0.5	-	[375]	361
$O + HO_2 = OH + O_2 +$ $+ 54.4 \pm 3$	300	9.70	-	-	-	dis. flow	[964]	363
$O + H_2O = OH + OH -$ $- 16.6 \pm 0.6$	840–935	-	13.62±0.29	0	18.5±1.5	fl.	[1028]	
	960–1080	-	15.88	0	20.84	comp.	[1408]	364
	1500–3500	-	13.84	0	17.75	-	[880]	
	1600	12.04±0.14	-	-	-	fl.	[242]	
	300–2000	-	13.92±0.8	0	18.1±1.0	-	[895]	365
	300–3500	-	13.94±0.19	0	18.46 ± 0.36	-	-	366
$O + H_2S = OH + SH +$ $+ 10.6$	room	10.23±0.15	-	-	-	dis., flow	[1022]	367
$O + H_2O_2 = OH + HO_2 +$ $+ 14 \pm 2$	-	-	-	0	$\angle$ 5	est.	[611]	
$O^{18} + CO^{16} = CO^{18} + O^{16}$	298–391	-	13.8±0.4	0	6.9±0.7	photol. NO_2^{18}	[835]	368
$O^{18} + CO_2^{16} = CO^{16}O^{18} +$ $+ O^{16}$	298 – 395	-	11.8±0.8	0	3.5±0.2	photol. NO_2^{18}	[835]	368
$O + CO_2 = O_2 + CO - 7.8$	623 – 693	-	13.30	0	14±2	dis., flow	[1665]	369
	2400 – 3000	-	15.87_6	-0.656	59.23	from k_ and K	[1457, 1290]	
$O + C_3O_2 = 3\ CO$	297	11.6	-	-	-	photol.	[1618]	
$O + C_3O_2 = CO_2 + C_2O$	297	10	-	-	-	photol.	[1618]	
$O + COS = SO + CO$	290 – 465	-	14.08	0	5.8±0.1	dis., flow N + NO, EPR mass spect.	[806]	
	room	9.73±0.07	-	-	-	dis.	[1455]	
$O + CS_2 = SO + CS$	305 and 410	-	12.8±0.2	0	0.6±0.3	pulse photol.	[1416]	
$O + N_2 = NO + N - 75 \pm 1$	2000 – 3000	-	-	0	74±5	shock	[631]	
	"	-	13.70	0	75.5	-	[189]	370
	"	-	13.70	0	75.0	-	[582]	371
	"	-	13.84_5	0	75.5	-	[1638]	372

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
O + NO = NO + O	298	12.04	-	-	-	dis., flow	[942,766]	
$O + NO = O_2 + N - 32$	450 - 5000	-	9.50	1	39.1	-	[1638]	373
	1500 - 1700	-	12.56	0	39.5±1.0	therm.	[894]	374
	1525 - 1912	-	10.76	0	22.9±3	"	[1629,1550]	375
	"	-	13.15	0	41.7	"	1550,899,894	376
	1600	7.82	-	-	-	therm., flow	[1550,894]	377
$O^{18} + N_2O^{16} = N_2O^{18} + O^{16}$	298 - 358	-	12.0±0.9	0	4.4±0.8	photol. NO_2^{18}	[835]	368
$O + N_2O = O_2 + N_2 + 79.3$	room	<8.30	-	-	-	dis., flow	[938]	378
	876 - 1031	-	10.48	0	14.5±2	therm., stat.	[896]	379,380
	973	~7.23	-	-	-	therm., stat., est.	"	
	1570 - 2330	-	13.2	0	25	shock	[1520]	
	900 - 2300	-	12.18	-	22.4	-	-	381
$O + N_2O = NO + NO + 36.3±2$	876 - 1031	-	11	0	15.5±1	therm., stat.	[896]	379
	~973	~7.54	-	-	-	"	"	
	1450 - 2000	-	14.30	0	28±3	fl.	[535]	
	1456 - 1635	-	14.30	0	32±4	fl.	[530]	
	1570 - 2330	-	13.2	0	25	shock	[1520]	
	1700 - 2300	-	13.355±0.075	0	25.0±0.8	"	[558]	382,383
	1800 - 2500	-	-	-	-	"	[698]	1671
	900 - 2300	-	13.56	0	27.2	-	-	381
$O^{18} + NO_2^{16} = NO^{16}O^{18} + O^{16}$	298	12.62	-	-	-	dis., flow	[766,942]	
$O + NO_2 = O_2 + NO + 46.2±1.5$	280 - 375	-	13.27±0.14	0	1.06±0.2	dis., flow	[941]	
	room	-	-	-	-	photol. NO_2	[1353]	384
	"	>11.78	-	-	-	dis.	[727]	
	"	>12.0	-	-	-	photol. NO_2	[931]	
	298	12.165±0.105	-	-	-	dis. NO_2 tit.	[1241]	
	"	12.32	-	-	-	photol. NO_2	[575,570]	385
	"	12.51±0.05	-	-	-	dis., flow	[941]	
	298 and 410	-	13.02±0.13	0	0.70±0.45	pulse photol.	[1416]	386
	300 ± 3	12.52	-	-	-	photol. NO_2	[573,141]	387
	300	12.62±0.06	-	-	-	photol., flow	[1464]	
	280 - 410	-	13.29±0.45	0	1.16±0.64	-	-	45

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + HNO = HO_2 + N$	-	-	11.72	1/2	37.5	-	[1288]	
$O + HNO = NO_2 + H$	-	-	10.7	1/2	3	est.	[1288]	
$O + HNO = O_2 + NH$	-	-	11	1/2	7	est.	[1288]	
$O + HNO = OH + NO + 53$	-	-	11.7	1/2	0	est.	[1288]	
$O + HNO_3 = OH + NO_3$	298	~13	-	-	-	photol. NO_2	[833]	
$O^{16} + O_2^{18} = O^{16}O^{18} + O^{18}$	295	12.0±0.2	-	-	-	dis.	[224]	
	298	11.78	-	-	-	dis., flow	[766,942]	
	298 - 402	-	12.6±0.5	0	1.1±0.4	photol.	[835]	368
$O + O_3 = O_2 + O_2 + 94.1\pm0.5$	188 - 373	-	13.23	0	4.8	dis., flow in O_2-Ar	[378]	388,389
	"	-	12.78	0	4.3	"	"	390
	188 - 910	-	12.73$_4$	0	4.3±1.0	-	[307a]	391
	273 - 353	-	12.63	0	3.2±0.1	cr. beams	[991,992]	
	"	-	12.68	0	3.26	"	[307a,991, 992,1538]	392
	278 - 298	-	-	-	5 ± 1	photochem.	[327]	393
	room	10.69±0.09	-	-	-	dis., N_2, $N+NO=N_2+O$	[397]	
	"	10.30	-	-	-		[992]	
	298	9.73	-	-	-	dis., flow	[1061,1062]	394,395
	"	10.17±0.09	-	-	-	"	[1241]	396
	343 - 373	-	13.53	0	5.7	therm.	[144,145]	397
	"	-	11.98	1/2	5.6	"	"	"
	393 - 443	-	12.36	0	5.0 ± 1.0	"	[1761]	
	409 - 499	-	13.26±0.35	0	4.1±0.5	"	[1731]	50
	769 - 910	-	13.37±0.09	0	5.6±0.5	shock	[869]	398
	188 - 910	-	12.57±0.39	0	3.73±0.61	-	-	399
$O + SO_3 = O_2 + SO_2 + 36.3\pm0.2$	room	-	-	-	>7	dis., flow NO_2 tit.	[889]	
	1650	~12.0	-	-	-	fl.	[1177,545]	
$O + Cl_2 = ClO + Cl + 6.2$	174 - 396	-	12.75±0.11	0	3.1 ± 0.1	dis., flow	[375]	
	"	-	11.34±0.14	1/2	2.9±0.1	"	"	
	300	10.65±0.04	-	-	-	N (dis.) + NO, flow	[1187]	
	-	-	12.27$_4$	0.67	0.4	est.	[1287]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + ClO = O_2 + Cl + 54.7$	room	12 - 13	-	-	-	dis., flow	[889]	
	room?	≥ 12.9	-	-	-	"	[584]	
	298	> 12.78	-	-	-	"	[374]	
	-	-	-	-	< 2	-	[374,375]	
$O + ClO_2 = O_2 + ClO + 60.3 \pm 1.5$	298	<13.38	-	-	-	dis., flow	[374]	
$O + Cl_2O = 2\ ClO + 29.2$	room?	12.91 ± 0.07$_5$	-	-	-	dis., flow	[584]	
$O^{18} + CO^{16}Cl_2 = CO^{18}Cl_2 + O^{16}$	298	9.27 ± 0.09	-	-	-	photol. NO_2^{18}	[835]	368
$O + HCl = OH + Cl - 0.8 \pm 0.3$	-	-	11.36	0.64	0.9	est.	[1287]	
	295-371	-	12.2±0.14	0	4.8	dis., flow, EPR	[1707a]	
$O + NH = OH + N + 18.4 \pm 3.3$	1000 - 4000	-	12.0	1/2	0.1	calc.	[1071]	
	-	-	12.92	0.7	0.1	-	[1288]	
$O + NH = NO + H + 67 \pm 4$	-	-	11.7	1/2	5	-	[1288]	
$O + NH_2 = OH + NH + 11 \pm 2.3$	-	-	11.96	1/2	0	est.	[1288]	
$O + NH_3 = OH + NH_2 - 2.6 \pm 2.3$	300 - 1000	-	12.08	0	6.0	dis.	[8]	
	350 - 600	-	12.0	0	4.9	dis., flow, hom. react.	[1632]	400,401
	843 - 963	-	13.26 ± 0.14	0	10.0 ± 0.5	inhib.	[1752,1748]	
	350 - 1000	-	12.04 ± 0.10	0	4.99 ± 0.26	-	-	402,93
$O + NH_3 = H_2O + NH$ or $H_2 + HNO$	348 - 458	-	10.05	0	<0.5	dis., flow	[1677]	
$O + PH_3 = ?$	293	-	-	0	0.6	photochem.	[1108,1100]	
	"	9.49	-	-	-	ignit. lim.	[443,1101, 1188]	
$O + HCN = NCO + H$	469 - 574	-	12.71$_6$	0	8.1 ± 1.2	dis., N_2	[442]	
$O + ClCN = NCO + Cl$	524 - 625	-	12.17$_6$	0	6.9 ± 0.7	dis., N_2	[442]	
$O + BrCN = NCO + Br$	546 - 634	-	13.14$_6$	0	9.7 ± 1.2	dis., N_2	[442]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + CN = CO + N$	570 - 687	-	13.72±0.27	0	2.4±0.7	dis., flow	[191]	
$O + C_2N_2 = NCN + CO$, $NCO + CN$	535 - 680	-	13.60	0	11.0±2.0	dis., flow, $N+NO=N_2+O$	[1390]	
	570 - 687	-	13.39_5±0.05	0	11.0±2.0	dis., N_2, N+NO, flow	[191]	
$O + ICN = IO + CN$	room?	≥ 10	-	-	-	dis. flow	[658]	
$O + CH_2 = CO + 2\,H$	298	-	-	-	-	dis., EPR	[245,246]	403
$O + CH_3 = HCHO + H$	300	≥ 13.25_5	-	-	-	dis., flow	[1184,1185]	
	1210 - 1900	13.27±0.07	-	-	-	fl.	[538]	404
	"	-	13.54	0	3.2	"	"	405
$O + CH_4 = OH + CH_3 - 0.2±2$	295 - 533	-	13.30±0.23	0	6.6±1.5	dis., flow	[281]	406
	"	-	12.79±0.23	0	7.3±1.5	"	"	407
	"	-	12.82	0	7.35	"	[13]	
	350 - 600	-	12.24±0.24	0	6.9±1.5	"	[1631]	408
	375 - 576	-	14.0	0	10.0	"	[1633]	
	375 - 583	-	13.31	0	7.8	"	[1678]	409
	400 - 580	-	12.76±0.41	0	6.8	fl.	[1711]	
	400 - 930	-	13.78	0	8.8	therm. lim.	[1710]	
	405 - 895	-	13.23±0.05	0	8.7±0.7	dis., flow	[1584]	
	450 - 600	-	12.83±0.13	0	7.7±0.3	"	[245]	
	843 - 933	-	13.74±0.10	0	8.7±0.8	inhib.	[1695,1704]	
	1220 - 1800	-	~14.23	0	~10	fl.	[539]	
	1600	≤ 12.30	-	-	-	"	"	410
	295 - 1800	-	13.70±0.16	0	8.99±0.38	-	-	411
$O + C_2H_6 = OH + C_2H_5 + 4.4±1.3$	297 - 398	-	12.54	0	4.3	Hg photo.	[1359]	412
	313 - 503	-	12.73	0	5.2	dis., flow	[1678]	413
	320 - 500	-	13.25±0.05	0	6.1±0.4	dis., flow, $N+NO = N_2+O$	[1584]	
	863 - 933	-	13.93	0	7.5	inhib.	[1700a]	
	297 - 933	-	12.47±0.21	0	4.57±0.38	-	-	414
	313 - 933	-	12.60±0.13	0	5.02±0.26	-	-	"
$O + C_3H_8 = OH + C_3H_7$	297 - 398	-	12.72	0	3.8	Hg photo.	[1359]	412,415
	863 - 923	-	14.02±0.15	0	6.2±0.5	inhib.	[1703]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + n\text{-}C_4H_{10} = OH + C_4H_9$	231 - 433	-	$13.54_4 \pm 0.14_4$	0	4.2 ± 0.2	dis., flow	[507]	
	room	10.32	-	-	-	photol. NO_2	[574]	417
	303	9.82	-	-	-	dis., flow O from N+NO	[1641]	418,419
	307 - 398	-	13.04	0	4.1	Hg photo., stat.	[1046]	420
	313 - 468	-	12.90	0	4.1	dis., flow	[1680]	421
	873 - 923	-	13.87 ± 0.14	0	4.2	inhib.	[1703]	
	231 - 923	-	13.94 ± 0.12	0	4.80 ± 0.20	-	-	422
$O + sec\text{-}C_4H_{10} = OH + sec\text{-}C_4H_9$	231 - 433	-	13.45 ± 0.15	0	4.2 ± 0.2	dis., flow	[507]	
	303	8.18	-	-	-	"	[1641]	423
	313 - 468	-	12.9	0	4.1	"	[1680]	
$O + (CH_3)_4C = OH + C_5H_{11}$	303	7.24	-	-	-	dis., flow O from N+NO	[1641]	424
$O + n\text{-}C_7H_{16} = OH + C_7H_{15}$	307 - 398	-	13.21_4	0	3.3	Hg photo., stat.	[1046]	420
$O + n\text{-}C_8H_{18} = ?$	353 - 473	-	13.26	0	4.2	dis., flow	[1684]	
$O + iso\text{-}C_8H_{18} = OH + C_8H_{17}$	307 - 398	-	12.72	0	2.9	Hg photo., stat.	[1046]	420
$O + C_2H_4 = OH + C_2H_3(?)$	570 - 660	-	14.11 ± 0.16	0	8.1 ± 0.5	inhib.	[1701]	
$O + C_2H_4 = CH_3 + HCO$	298	11.50 ± 0.06	-	-	-	dis., EPR	[245]	
	300	11.49 ± 0.05	-	-	-	dis., flow	[1184,1185]	
$O + C_2H_4 =$ products	195 - 715	-	-	-	-	dis., flow EPR	[1587]	424a
	297	11.79	-	-	-	Hg photo.	[1357]	
$O + C_3H_6 = ?$	297 - 398	12.81	-	0	0.6	Hg photo.	[1359]	532,412
	361 - 482	-	12.24	0	3.0	dis., flow	[1679]	425
$O + C_4H_8\text{-}1 =$ products	297	12.41	-	-	-	Hg photo.	[1357]	
$O + C_4H_8\text{-}2 = ?$	363 - 523	-	12.41	0	3.8	dis., flow	[1684]	425
$O + iso\text{-}C_4H_8 = ?$	318 - 538	-	12.38	0	2.55	dis., flow	[1679]	425

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + C_2H_2 = CO + CH_2$	195 - 295	-	-	0	< 1	dis. in N_2, N+NO	[36]	
	room	1.70±0.14	-	-	-	"	"	
	"	11.03±0.07	-	-	-	dis. , flow	[36,1183]	
	"	10.95±0.09	-	-	-	".	[1454]	
	"	11.08	-	-	-	"	[930]	
	"	10.98_4	-	-	-	dis. , N+NO	[805]	
	297 - 398	-	13.41_5	0	3.2	Hg photo.	[1359]	426,427, 412
	298	10.96±0.02	-	-	-	dis. , EPR	[245,246]	
	393 - 563	-	11.24	0	3.1	dis. , flow	[1682]	428
	970 - 1660	~13.15±0.15	-	-	-	fl.	[542]	429
	468 - 573	-	-	-	<1	dis. , flow	[36,1183]	
	1000 - 1700	-	12.7	0	2.5	comp.	[248]	
$O + CH_3CCH = CO + CH_3CH$	298	11.59±0.11	-	-	-	dis. , EPR	[245]	
$O + C_4H_2 = CO + C_3H_2$	300	11.95±0.06	-	-	-	dis. , flow	[1186,1183]	
O + cyclo-C_3H_6 = OH + + cyclo-C_3H_5	297 - 398	-	11.28	0	3.4	Hg photo., photol. N_2O	[1359]	412,430
	298 - 398	-	11.49	0	3.8	"	[1444]	431
O + cyclo-C_4H_8 = OH + + cyclo-C_4H_7	298 - 398	-	12.78	0	3.9	Hg photo., photol. N_2O	[1444]	431
O + cyclo-C_5H_{10} = OH + + cyclo-C_5H_9	298 - 398	-	12.68	0	2.6	Hg photo., photol. N_2O	[1444]	431
O + cyclo-C_6H_{12} = OH + + cyclo-C_6H_{11}	298 - 398	-	12.88	0	2.8	Hg photo., photol. N_2O	[1444]	431
	353 - 493	-	13.73	0	4.5	dis. , flow	[1681]	432,433
	298 - 493	-	13.12±0.41	0	3.25±0.69	-	-	434
$O + C_6H_6 = ?$	338 - 493	-	13.24	0	4.7	dis. , flow	[1681]	433
$O + CH_3OH = OH + CH_2OH$	298	-	-	-	-	Hg photo., photol. N_2O	[887]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + CH_3OH = H_2O + HCHO$	347 - 400	-	11.71	0	3.1	dis., flow	[1675]	
$O + C_2H_5OH = H_2O +$ $+ CH_3CHO$ and $H_2O + HCHO +$ $+ CH_2$	343 - 523	-	12.78	0	4.0	dis., flow	[1683]	
$O + C_2H_5OH = OH +$ $+ CH_3CHOH$	298	10.79	-	-	-	Hg photo. N_2O	[886]	
$O + C_2H_5OH = OH +$ $+ [C_2H_5O]$	903 - 963	-	13.11±0.12	0	5.5±1.0	inhib.	[1721]	435
$O +$ iso-$C_3H_7OH = OH +$ $+ (CH_3)_2COH$	298	10.98	-	-	-	Hg photo. N_2O	[887]	
$O + (CH_3)_2O = OH +$ $+ CH_2OCH_3$	307 - 398	-	13.8	0	2.5	Hg photo.	[1046]	420
$O + HCO = OH + CO$	300	-	-	-	-	dis., flow	[1184]	436
$O + HCHO = OH + HCO$	300	10.69±0.08	-	-	< 5.5	dis., flow O from N+NO	[1182, 1183]	
	1655 - 1680	-	14	0	< 8	fl.	[595]	437
	300 - 1680	-	14	0	3.3	-	-	438
$O + CH_3CHO = OH +$ $+ CH_3CO$	room	11.59	-	-	-	-	[417]	439
	"	11.50_5	-	-	-	photol. NO_2	[574]	417
	299 - 476	-	13.02_4± ±0.12	0	2.3	dis., O_2, N + NO	[282]	
	343 - 428	-	11.56	0	2.75	dis., flow	[1685]	428
$O + C_2H_5CHO = ?$	398 - 523	-	12.02	0	2.85	dis., flow	[1683]	428
$O + (CH_3)_2O = OH +$ $+ CH_2OCH_3$	307 - 398	-	12.15_5	0	2.5	Hg photo. N_2O	[1049]	440
$O + (CH_2)_2O = OH +$ $+ CHOCH_2?$	307 - 398	-	10.20	0	1.8	Hg photo. N_2O	[1049]	
$O + CH_3Cl = OH + CH_2Cl$	353 - 949	-	13.25_5	0	7.93	dis., N_2	[1624]	441

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + CCl_4 = COCl_2 + Cl_2$ or $CO + 2\ Cl_2$	278 - 370	-	$10.23_5 \pm 0.2$	0	4.5 ± 0.6	dis. , O_2, flow	[1536]	
$O + CH_2ClCH_2Cl = 2\ HCl + CO + CH_2$	353 - 473	-	13.08	0	5.5	dis. , flow	[1676]	
$O + CH_3F = OH + CH_2F$	858 - 948	-	12.89	0	9.7 ± 0.8	inhib.	[1758]	
$O + C_2F_4 = CF_2O + CF_2$	296	11.76	-	-	-	Hg photo.	[1357]	442
	297 - 398	-	12.26 ± 0.09	0	0.65 ± 0.12	"	[1359]	443
	296	-	12.20	0	0.6	"	[1357]	412, 1673
$O + C_3F_6 = FCFO, CF_3CFO + \ldots$	297	10.32	-	-	-	Hg photo.	[1358]	444,445
	297 - 398	-	11.88_6	0	2.2	"	[1359]	412
$O + C_3F_6 = CF_2O, CF_3CFO, \ldots + \ldots$	297 - 398	-	-	-	-	Hg photo.	[1359]	446
$O + CH_3Br = OH + CH_2Br$ and $OBr + CH_3$	638 and 949	-	~ 13.3	0	~ 6.0	dis. , N_2	[1624]	
$O + CH_3NH_2 = OH + [CNH_4]$	843 - 963	-	13.51	0	5.9	inhib.	[1748]	19
$O + O = O_2'(A^3\Sigma_u^+) = O_2 + h\nu$	room	3.33	-	-	-	dis. , flow	[1657]	
	"	3.14	-	-	-	"	[1655]	447
$O + O = O_2 + h\nu$	2691 - 3259	-	6.63	0	28.9 ± 2.2	shock	[1172]	
$O + O + He = O_2'(b^1\Sigma_g^+) + He$	room	11.67	-	-	-	dis. , flow	[1655]	
$O + O + Ar = O_2 + Ar$	room	14.0	-	-	-	photol. O_2	[301]	
	"	14.51	-	-	-	dis. , flow	[1140]	
	"	14.53	-	-	-	"	[1311,1140]	448
	300	15.11	-	-	-	dis. , flow, EPR	[1055]	
	350	15.36 ± 0.18	-	-	-	dis. , flow	[963]	449
	2000	13.40	-	-	-	shock	[1636,1637]	
	3500	13.36	-	-	-	"	[701]	
	"	13.71_6	-	-	-	"	[304,1325]	
	"	13.65	-	-	-	"	[275,1325]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	3600	15.95	-	-	-	shock	[301]	
	4000	14.48	-	-	-	"	"	
	4200	15.08	-	-	-	"	"	
	4535 - 5170	-	16.90±25%	-1	0	"	[1323]	
	300 - 5000	-	15.56±0.20	-0.64± ±0.06	0	-	-	450
$O + O + Ar = O_2'(b^1\Sigma_g^+) + Ar$	room	11.08	-	-	-	dis., flow	[1655]	
$O + O + Kr = O_2 + Kr$	3420 - 5325	-	17.20±25%	-1	0	shock	[1323]	
	3500	13.66	-	-	-	"	[701]	
$O + O + Xe = O_2 + Xe$	3000 - 6000	-	17.67±15%	-1	0	shock	[1325]	
	3500	14.11	-	-	-	"	"	451
$O + O + Na = O_2 + Na'(3^2P)$	1250 - 1750	18.56	-	-	-	fl.	[315]	
$O + O + O = O_2 + O$	room	~15	-	-	-	photol. O_2	[301]	
	3000 - 6000	-	18.68±20%	-1	0	shock	[1325]	451
	3400-7500	-	20.34	-3/2	0	-	[1016, 1015]	
	3500	15.11	-	-	-	shock	[304, 1325]	
	"	14.99_6	-	-	-	"	[275, 1325]	
	"	15.14_7	-	-	-	"	[1325]	
$O + O + H_2 = O_2 + H_2$	196	15.90±0.03	-	-	-	act. N_2	[311]	
$O + O + N_2 = O_2 + N_2$	196	15.68±0.08	-	-	-	act. N_2	[311]	
	room	15.21	-	-	-	dis., flow, $N+NO=N_2+O$	[1139]	
	"	15.00	-	-	-	dis., flow	[1140]	452
	3400-7500	-	15.79	-1/2	0	shock	[1015]	
	300-7500	-	17.41±0.33	-0.93 ±0.10	0	-	-	453
$O + O + N_2 = O_2'(A^3\Sigma_u^+) + N_2$	room	10.88	-	-	-	dis., flow	[1655]	
$O + O + N_2 = O_2'(b^1\Sigma_g^+) + N_2$	room	10.79	-	-	-	dis., flow	[1655]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + O + O_2 = O_2 + O_2$	room	~15	-	-	-	photol. O_2	[301]	
	"	15.0	-	-	-	pulse photol.	[635, 891]	454
	"	15.02±0.12	-	-	-	dis., flow	[891]	
	"	<15.7	-	-	-	dis., flow, EPR	[966, 891]	455
	"	15.7	-	-	-	dis., flow	[966]	456
	298±3	14.98±0.14	-	-	-	dis., flow	[900]	
	300	14.48	-	-	-	calc.	[1015]	
	300	14.91	-	-	-	dis., flow, EPR	[1055]	
	350	≤ 14.30	-	-	-	dis., stat.	[964]	
	1500 - 2800	-	18.6 ± 1.8	-1.22 ±0.53	0	shock	[925]	
	3000	15.3	-	-	-	"	[1421]	
	3000 - 3800	-	39.64	-7	-	"	"	
	3000 - 6000	-	18.20±20%	-1	0	"	[1323]	
	3400 - 7500	-	19.90	-3/2	0	-	[1016, 1015, 303]	
	3500	14.66	-	-	-	shock	[1325, 1324]	
	"	14.20	-	-	-	"	[304, 1325]	
	"	14.68	-	-	-	"	[275, 1325]	
	"	14.90	-	-	-	"	[1065]	
	"	14.30	-	-	-	"	[1741]	
	3800	14.6	-	-	-	shock	[1421]	
	-	-	18.4	-1	0	-	[1620]	
	300 - 6000	-	15.99±0.35	-0.41 ±0.11	0	-	-	457
$O + O + H_2O = O_2 + H_2O$	360 - 520	-	12.96	1	0	dis., flow	[1666]	458
$O + O + CO_2 = O_2 + CO_2$	room?	16.32	-	-	-	pulse radiol.	[1096]	
$O + O + M = O_2 + M$	room	14.99±0.05	-	-	-	dis., flow	[1311]	459
	3400 - 7500	-	15.40	-1/2	-	-	[1016, 303]	460
	3500	14.30	-	-	-	shock	[341, 1325]	461
$O + O + M = O_2^{!}(b^1\Sigma_g^+) + M = O_2 + M + h\nu$	room	10.60	-	-	-	dis., flow	[1657]	
$O + OH + O_2 = HO_2 + O_2$	300	16.7	-	-	-	-	[1285]	
$O + CO = CO_2 + h\nu$	293	3.90±0.05	-	-	-	dis.	[392, 393]	462
	421 - 550	-	10.86	0	3.5	dis., flow	[1669, 1670]	
	2943	5.58	-	-	2.5 ± 0.6	shock	[1171]	463

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + CO \rightarrow CO_2^*$	338 - 532	-	11.15	0	9.5	dis. , flow	[1036]	464
	373 - 523	-	10.14	0	5.8	therm.	[1739]	
$O + CO + Ar = CO_2 + Ar$	1400 - 3000	~13.77	-	-	-	shock , comp.	[247]	
	2800 - 3600	13.3-14.0	-	-	-	shock	[214]	465
$O + CO + CO = CO_2 + CO$	room	12.24	-	-	-	photol.	[693]	
	470	≤ 13.56	-	-	-	therm.	[1738]	466
$O + CO + CO_2 = CO_2 + CO_2$	room	<14.7	-	-	-	dis. , flow	[889]	
$O + CO + O_2 = CO_2 + O_2$	293	<13.48	-	-	-	dis. , flow	[392]	
	470	14.19	-	-	-	therm.	[1738]	466
$O + CO + M = CO_2 + M$	293	<13.7	-	-	-	dis. , flow	[392]	467
	room.	11.70	-	-	-	photol.	[822]	
	373 - 523	-	14.54	0	2.1	therm.	[1739]	468,469
	″	-	15.34	0	3.7	-	[1457]	470
	409 - 502	-	12.65±0.52	0	-2.58±0.86	therm.	[1738]	471
	490	13.81	-	-	-	therm.	[604]	472,473
	-	-	19.26	-1	0	est.	[1230]	
$O + CO \rightarrow CO_2$	338 - 532	-	10	0	4.0	dis. , flow	[1036]	474
	420 - 550	-	11	0	3.8	″	[1669,955]	475
	″	-	9.25_6	1/2	3.0	″	[1669]	
	456	7	-	-	-	pyr. O_3	[1160]	476
$O + NO = ONO^*$	298	12.30	-	-	-	dis. , flow	[941]	477
$O + NO = NO_2 + h\nu$	212 - 315	-	6.48	0	-1.5 ± 0.4	dis. , flow	[392]	
	″	-	10.52_5	-1.2 ± 0.3	0	″	″	
	290	12.16-12.36	-	-	-	″	[449]	478
	room	$7.58_5\pm30\%$	-	-	-	″	[567,569]	479
	″	7.17_7	-	-	-	″	[889]	480
	~1600	~6.00	-	-	-	fl.	[879,997]	
	≤ 2100	5.48	-	-	-	″	[255,256]	
	3750	5.38	-	-	-	shock	[997]	
	230 - 3750	-	11.03	-1.59	-0.67	-	[997]	481
	212 - 3750	-	12.39 ± 0.46	∓2.01 -0.16	0	-	-	482

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + NO + He = NO_2 + He$	279	16.29±0.02	-	-	-	dis. , flow	[1195]	
	293	16.27±0.03	-	-	-	"	"	
	"	16.25±0.07	-	-	-	"	[392]	
$O + NO + He = NO_2^{\prime} + He$	room	16.17	-	-	-	dis. , flow	[1655a, 903, 1172a]	1669
$O + NO + Ar = NO_2 + Ar$	279	16.31±0.04	-	-	-	dis. , flow	[505, 1195]	483
	293	16.26±0.03	-	-	-	"	"	
	"	16.42±0.05	-	-	-	"	[395, 392]	
	room	16.44	-	-	-	"	[730]	
	"	16.34	-	-	-	"	[903, 378]	
$O + NO + Ar = NO_2^{\prime} + Ar$	room	16.13	-	-	-	dis. , flow	[1655a, 903, 1172a]	1669
$O + NO + H_2 = NO_2^{\prime} + H_2$	room	16.34	-	-	-	-	[1655a, 903, 1172a]	1669
$O + NO + N_2 = NO_2 + N_2$	279 and 293	16.91_5	-	-	-	dis. , flow	[1195]	
	293	16.49±0.06	-	-	-	"	[392]	
	room	16.25_5	-	-	-	photol. NO_2	[574]	
	"	~16.40	-	-	-	dis. , flow, NO_2 tit.	[889]	484
	297	16.66	-	-	-	dis. , flow	[938]	
	298	16.56±0.01	-	-	-	dis. , flow $N+NO=N_2+O$	[941]	
	298 - 500	-	15.15±0.06	0	-1.93±0.1	"	"	485
	300	16.46	-	-	-	photol. NO_2	[573, 941]	387
$O + NO + N_2 = NO_2^{\prime} + N_2$	room	16.32	-	-	-	dis. , flow	[1655a, 903, 1172a]	1669
$O + NO + O_2 = NO_2 + O_2$	212 - 315	-	14.954	0	-1.8±0.4	dis. , flow	[392]	
	"	-	20.13	-1.5±0.4	0	"	"	
	279 - 293	-	16.09	0	-0.24	"	[1195]	
	293	16.27±0.03	-	-	-	"	"	486
	"	16.43±0.05	-	-	-	"	[392]	487
	300	16.46	-	-	-	dis. , flow EPR and NO_2 tit.	[1582]	
	1700 - 2300	-	17.98	-1	0	shock	[558]	489
	212 - 2300	-	21.43±0.23	-2.04±0.09	0	-	-	488

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + NO + O_2 = NO_2^* + O_2$	room	16.31	-	-	-	dis., flow	[1655a,903, 1172a]	1669
$O + NO + NO = NO_2^* + NO$	room	16.40	-	-	-	photol. NO	[1655a,903, 1172a]	1669
$O + NO + CO_2 = NO_2 + CO_2$	213 and 294	-	16.13	0	-0.23	dis., flow	[1195]	
	room	16.54±0.06	-	-	-	"	[889]	490
$O + NO + CO_2 = NO_2^* + CO_2$	room	16.57	-	-	-	dis., flow	[1655a,903, 1172a]	1669
$O + NO + N_2O = NO_2^* + N_2O$	room	16.53	-	-	-	dis., flow	[1655a,903, 1172a]	1669
$O + NO + CH_4 = NO_2^* + CH_4$	room	16.39	-	-	-	dis., flow	[1655a,903, 1172a]	1669
$O + NO + M = NO_2 + M$	279	16.31±0.04	-	-	-	dis., flow	[505]	491
	293	16.27±0.02	-	-	-	"	"	"
	room	16.39±0.04	-	-	-	dis., flow, NO_2 tit.	[889]	492,493
	296	16.65±0.05	-	-	-	dis., flow	[890]	494
	300	14.99±0.05	-	-	-	"	[1311]	495
	973	15.86	-	-	-	therm.	[896]	496
	1031	15.71_5	-	-	-	"	"	"
$O + O_2 = O_3^*$	296	11.84±0.5	-	-	-	dis.	[1351]	
	298	11.95	-	-	-	-	[941]	477,497
$O + O_2 + He = O_3 + He$	298	14.37	-	-	-	pyr. O_3	[1160]	
	300	14.16	-	-	-	pyr. O_3, flow	[904]	
$O + O_2 + Ar = O_3 + Ar$	180 - 1000	-	12.52	0	-2.3	-	[378]	498,499
	"	-	20.70	-2.6	0	-	"	"
	188 - 373	-	12.95	0	-1.8±0.4	dis., flow	[378,377]	
	"	-	22.73	-3.4±0.8	0	"	[378]	
	193 - 373	-	12.90	0	-1.9	dis., flow	[377]	
	213 - 386	-	13.23±0.05	0	-1.68±0.1	pyr. O_3	[1160]	
	"	-	21.87±0.54	-3.0±0.2	0	"	"	
	293	14.72±0.08	-	-	-	dis., flow	[395]	500

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	296	14.28	-	-	-	dis., flow	[378]	
	"	13.99±0.09	-	-	-	pulse radiol.	[1351]	501
	300	14.15±0.11	-	-	-	pyr. O_3, flow	[1731,904]	
	"	13.92±0.05	-	-	-	pulse radiol.	[1355]	
	303 - 863	-	12.78±0.05	0	-1.7±0.3	-	[869]	502
	"	-	18.09	-1.66	0	-	"	"
	180 - 1000	-	21.08±0.68	-2.73 ±0.27	0	-	-	503
$O + O_2 + N_2 = O_3 + N_2$	300	14.30±0.09	-	-	-	pyr. O_3, flow	[904]	
	303 - 863	-	12.97±0.05	0	-1.7±0.3	-	[869]	502
	"	-	18.28	-1.66	0	-	"	"
$O + O_2 + O_2 = O_3 + O_2$	213 - 294	-	13.49	0	-0.7±0.2	dis., flow	[505]	504
	283	14.78	-	-	-	"	[454]	455,505
	294	14.0	-	-	-	"	[505]	
	room	13.97±0.27	-	-	-	pulse photol.	[110]	
	"	13.59±0.11	-	-	-	dis., flow	[900]	
	room?	~15.7	-	-	-	"	[966]	506
	"	14.17	-	-	-	pulse dis.	[1096]	
	room?	-	-	-	-	dis., flow	[1062]	1666
	-	14.04±0.04	-	-	-	-	[307]	507
	298	14.37_4	-	-	-	dis., flow	[941]	
	"	14.50±0.04	-	-	-	pyr. O_3, flow	[1160]	
	300	14.36±0.09	-	-	-	"	[904]	
	"	14.34	-	-	-	dis., flow	[728]	508, 509
	"	14.52	-	-	-	"	[358]	
	"	14.43	-	-	-	pyr. O_3	[902,889,890]	
	343-373	-	13.47	0	-0.89	therm.	[145, 682]	
	350	14.04	-	-	-	dis., flow	[964]	455
	300-1000	-	13.09	0	-1.09	from k_- and K	[1731]	
	200-400	-	15.89±0.75	-0.74 ±0.30	0	-	-	510
	"	-	13.73±0.11	0	-0.42±0.15	-	-	"
$O + O_2 + O_3 = O_3 + O_3$	343-373	-	13.78	0	- 0.6	therm.	[144, 145]	511, 512
	388-403	-	14.41	0	0.32	therm., flow, from k_- and K	[1660]	
	"	-	14.01	0	-0.4	therm.	[991]	
$O + O_2 + H_2O = O_3 + H_2O$	300	15.34	-	-	-	pyr. O_3, NO, flow	[904]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + O_2 + CO = O_3 + CO$	room?	14.20	-	-	-	pulse radiol.	[1096]	
$O + O_2 + CO_2 = O_3 + CO_2$	213 - 386	-	13.92±0.06	0	-1.45±0.14	pyr. O_3	[1160]	
	"	-	20.92±0.68	-2.4± ±0.3	0	"	"	
	294	14.41	-	-	-	dis., flow	[505]	513
	room?	14.57	-	-	-	pulse radiol.	[1096]	
	296	~15.6	-	-	-	dis., flow	[889]	
	298	14.99±0.06	-	-	-	pyr. O_3	[1160]	
	300	14.73	-	-	-	"	[904]	
	213 - 386	-	20.65±0.55	-2.4± ±0.3	0	-	-	514
$O + O_2 + N_2O = O_3 + N_2O$	room?	14.50_5	-	-	-	pulse radiol.	[1096]	
	300	14.73	-	-	-	pyr. O_3, NO, flow	[904]	
$O + O_2 + CF_4 = O_3 + CF_4$	300	14.76	-	-	-	pyr. O_3, NO, flow	[904]	
$O + O_2 + SF_6 = O_3 + SF_6$	300	15.09±0.04	-	-	-	pyr. O_3, NO, flow	[904]	
$O + O_2 + M = O_3 + M$	room?	14.30	-	-	-	-	[1372a]	495
$O + SO = SO_2 + h\nu$	room	9.54	-	-	-	dis., O_2, flow	[1392]	
	"	8.62±0.3	-	-	-	dis.	[1332]	
$O + SO + Ar = SO_2 + Ar$	room	17.48	-	-	-	dis., flow	[378]	
$O + SO_2 = SOOO^•$	room	12.04±0.04	-	-	-	photol.	[834]	
$O + SO_2 + Ar = SO_3 + Ar$	room	16.56	-	-	-	dis., flow	[1490]	
	299±2	15.38±0.03	-	-	-	dis., O_2, flow, hom. react., EPR	[1154]	515
	300	15.0	-	-	-	hom. react.	[1155]	516
$O + SO_2 + H_2 = SO_3 + H_2$	784	≥15.56	-	-	-	inhib.	[1577]	
$O + SO_2 + O_2 = SO_3 + O_2$	295	16.48	-	-	-	dis., flow	[889]	
	room	16.73	-	-	-	"	[1490]	
	299±2	15.42±0.08	-	-	--	dis., O_2, flow	[1154]	515,517
	300	15.0	-	-	-	-	[1155]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + SO_2 + SO_2 = SO_3 + SO_2$	299±2	15.96±0.19	-	-	-	dis. , O_2, flow	[1154]	515
$O + SO_2 + M = SO_3 + M$	room	16.15±0.04	-	-	-	photol. NO_2	[834]	518
	"	16.48	-	-	-	dis. , flow	[889]	
	2150	15.3	-	-	-	fl.	[1177]	519
$O + NO_2 = ONO_2$	room	12.98	-	-	-	dis. , flow	[941]	477
	298	12.78	-	-	-	photol. NO_2	[570]	520
$O + NO_2 + N_2 = NO_3 + N_2$	300±3	17.0	-	-	-	photol. NO_2	[573]	521
$O + NO_2 + CO_2 = NO_3 + CO_2$	298	17.18	-	-	-	-	[174a]	522
$O + NO_2 +$ iso-C_4H_{10} = $NO_3 +$ iso-C_4H_{10}	298	18.48	-	-	-	-	[174a]	522
$O + NO_2 + C_2H_4 = NO_3 + C_2H_4$	298	17.81	-	-	-	-	[174a]	522
$O + NO_2 + C_3H_8 = NO_3 + C_3H_8$	298	17.93	-	-	-	-	[174a]	522
$O + NO_2 + CF_2Cl_2 = NO_3 + CF_2Cl_2$	298	18.28	-	-	-	-	[174a]	522
$O + C_2H_4 \rightarrow C_2H_4O$	223 - 465	-	13.01±0.15	0	1.6±0.2	dis. , flow	[507]	523
	223 - 613	-	12.925	0	1.6	"	[504]	
	room	11.66	-	-	-	photol. NO_2	[574]	417
	"	11.71	-	-	-	photol.	[420]	524, 525, 526
	"	11.69	-	-	-	"	[419, 418]	525
	"	>10.7	-	-	-	dis. , flow	[889]	
	"	-	-	-	-	Hg photo.	[1152]	527
	297 - 398	-	12.84	0	1.5	"	[1359]	528, 412
	298 and 398	13.39	-	0	2.6	"	[420, 1416, 421]	
	298 - 400	-	-	-	2.6-2.9	photol.	[420]	
	300 - 400	-	13.7	0	2.75±0.15	Hg photo.	[541, 420, 416]	529
	313 - 503	-	10.78	-	[illegible].35	dis. , flow	[1679]	530
	1220 - 1880	~13.48	-	-	-	fl.	[541]	523
	220 - 670	-	12.91±0.09	0	1.57±0.12	-	-	531

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O + C_3H_6 \rightarrow C_3H_6O$	room	12.47_5	-	-	-	Hg photo.	[419]	525
	297 - 398	-	12.81	0	0.6	"	[1359]	532,412
$O + C_4H_8 \rightarrow C_4H_8O$	231 - 433	-	13.45±0.15	0	4.2±0.2	dis. , flow	[507]	
$O + n\text{-}C_4H_8\text{-}1 \rightarrow C_4H_8O$	223 - 663	-	13.10	0	0.85	dis. , flow	[504]	
	room	12.48	-	-	-	photol. NO_2, Hg photo.	[574, 419 418]	
	295	12.21	-	-	-	photol. NO_2	[1353]	533
	297 - 398	-	-	-	-	Hg photo.	[1359]	534
	298 and 410	-	12.86±0.07	0	0.8±0.4	pulse photol.	[1416]	535
	298 - 410	-	13.18	0	1.20	est.	[420, 1359]	
	299 and 398	-	-	-	-	Hg photo.	[420, 421]	536
$O + iso\text{-}C_4H_8 \rightarrow C_4H_8O$	room	13.11	-	-	-	photol. NO_2	[574]	417
	"	-	-	-	-	Hg photo.	[1152]	537
	295	12.96	-	-	-	photol. NO_2	[1353]	533
	299 and 402	-	-	-	-	Hg photo.	[420, 421]	536
	298 and 410	-	12.95±0.08	0	0.1±0.4	pulse photol.	[1416]	535
	300 and 523	-	13.31	0	0.4	dis. , flow	[504]	
	300 - 520	-	13.28±0.18	0	0.34±0.27		-	538
	300 - 520	-	11.93±0.90	0.44 ±0.35	0	-	-	538
$O +$ cis- butene-2 $\rightarrow C_4H_8O$	room	13.00	-	-	-	photol. NO_2	[574]	417
	"	13.04	-	-	-	Hg photo.	[419, 418]	525
	298	13.08	-	-	-	"	[421]	
	300 and 523	-	13.36	0	0.36	dis. , flow	[504]	
$O +$ trans- butene-2 $\rightarrow C_4H_8O$	room	13.17	-	-	-	photol. Hg $+ N_2O$	[419]	525
$O +$ cis- 2-pentene $\rightarrow C_5H_{10}O$	room	13.04	-	-	-	photol. NO_2	[574]	
	"	13.07	-	-	-	photol. Hg $+ N_2O$	[419]	525
$O +$ trimethylethylene $\rightarrow C_5H_{10}O$	room	13.61	-	-	-	photol. Hg $+ N_2O$	[420]	525, 539
$O +$ tetramethylethylene $\rightarrow C_6H_{12}O$	room	13.72	-	-	-	photol. Hg $+ N_2O$	[420]	525, 539
	"	13.73_5	-	-	-	"	[419]	525

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
O + cyclopentene → cyclo-C_5H_8O	room	13.19	-	-	-	photol., $Hg+N_2O$	[420]	525,539
	"	"	-	-	-	"	[419]	525
O + cyclohexene → cyclo-$C_6H_{10}O$	room	13.15	-	-	-	photol., $Hg+N_2O$	[420]	525,539
$O + C_6H_6 \rightarrow C_6H_6O$	393 - 494	-	-	0	4.7	Hg + NO_2, flow	[114]	
$O + C_6H_5CH_3 \rightarrow C_6H_5CH_3O$	393 - 493	-	-	0	4.0	Hg + NO_2, flow	[862]	
$O + H_2CCFCH_3 \rightarrow C_3H_5FO$	room	-	-	-	-	Hg photo.	[1152]	540
$O + H_2CCHCH_2F \rightarrow C_3H_5FO$	room	-	-	-	-	Hg photo.	[1152]	541
$O + H_2CCHCH_2CH_2F \rightarrow C_4H_7FO$	room	-	-	-	-	Hg photo.	[1152]	542
$O + F_2CCHCH_3 \rightarrow C_3H_4F_2O$	room	-	-	-	-	Hg photo.	[1152]	543
$O + H_2CCHCF_3 \rightarrow C_3H_3F_3O$	room	-	-	-	-	Hg photo.	[1152]	544
$O + CF_3CH_3CCH_2 \rightarrow CF_3CH_3COCH_2$ (oxide) and CF_3CH_3CHCHO	room	-	-	-	-	Hg + N_2O	[1153]	545
$O + H_2CCCH_3CF_3 \rightarrow C_4H_5F_3O$	room	-	-	-	-	Hg photo.	[1152]	546
$O + CH_2CO \rightarrow CH_2CO_2^*$	298	11.72	-	-	-	dis., flow	[321]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$S + COS = S_2 + CO$	2570	11.78	-	-	-	shock	[736]	547,548
$S + S + Ar = S_2' + Ar$	room?	14.86	-	-	-	dis.	[513]	
$S + COS + M = COS_2 + M$	room	15.45±0.15	-	-	-	pulse photol.	[113]	549
$S + CS_2 + M = CS_3 + M$	room	17.45±0.15	-	-	-	pulse photol.	[113]	550
$Se + C_2H_4 \rightarrow CH_2SeCH_2$	302-412	-	13.01±0.16	0	2.81±0.20	pulse photol. CSe_2	[292]	
$Se + C_3H_6 \rightarrow CH_2SeC_2H_4$	301	11.53±0.15	-	-	-	pulse photol. CSe_2	[292]	
	302 and 418	-	13.09±0.15	0	2.35±0.23	"	[293]	551
Se + butene-1 → $\rightarrow CH_2SeC_3H_6$	302 and 418	-	13.46$_5$±0.15	0	2.25±0.23	pulse photol. CSe_2	[293]	551
Se + cis-butene-2 → $\rightarrow C_2H_4SeC_2H_4$	302 and 418	-	13.25±0.20	0	1.21±0.27	pulse photol. CSe_2	[293]	551
Se + trans-butene-2 → $\rightarrow C_2H_4SeC_2H_4$	302 and 418	-	13.19±0.21	0	0.59±0.27	pulse photol. CSe_2	[293]	551
Se + isobutene → $\rightarrow CH_2SeC_3H_6$	302 and 418	-	13.33±0.20	0	1.01±0.25	pulse photol. CSe_2	[293]	551
Se + 1-pentene → $\rightarrow CH_2SeC_4H_8$	302 and 418	-	~13.38	0	2.21±0.44	pulse photol. CSe_2	[293]	551
Se + 1,3-butadiene → $\rightarrow C_2H_3SeC_2H_3$	302 and 418	-	13.68±0.20	0	0.88±0.25	pulse photol. CSe_2	[293]	551
$Se + C_2H_3Cl \rightarrow$ $\rightarrow CH_2SeCHCl$	302 and 418	-	12.82±0.26	0	2.44±0.28	pulse photol. CSe_2	[293]	551
$Se + C_3H_5Cl \rightarrow$ $\rightarrow CH_2SeC_2H_3Cl$	302 ± 3	11.16±0.10	-	-	-	pulse photol. CSe_2	[293]	551
Se + acrylonitrile → $\rightarrow CH_2SeCHCN$	302 and 418	-	~12.08	0	0.72±0.80	pulse photol. CSe_2	[293]	551

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$F + H_2 = HF + H$	298-351	-	14.08	0	1.71+ ±0.22	therm.	[1109,548, 549,547]	552
	405-435	-	12	0	5 - 7	"	[1005]	
	1000-4000	-	11.89	0.69	2.5	calc.	[1071]	
	3800-5300	-	13.31	-0.12	3.75	shock	[828,1287]	
	-	-	>13.48	0	8.0	-	[1228,1287]	
	-	-	10.39	1	8.0	calc.	[1287]	553
	-	-	12.7	0	5.7	est.	"	
$F + NH = HF + N$	-	-	12.15	0,68	0.6	est.	[1287]	
$F + NH_2 = HF + NH$	-	-	10.0	0,68	1.0	est.	[1287]	
	-	-	11.79	1/2	0.9	-	"	
$F + NH_3 = HF + NH_2$	-	-	11.63	1/2	0.8	-	[1287]	
$F + OH = HF + O$	-	-	11.7	1/2	6.0	est.	[1287]	
	-	-	12.46	0,68	0.2	"	"	
$F + H_2O = HF + OH$	-	-	11.7	1/2	7.0	est.	[1287]	
	-	-	11	1/2	6.0	"	"	
	-	-	10.15	0.68	0.6	"	"	
	-	-	11.75	1/2	0.5	-	"	
$F + Cl_2 = FCl + Cl$	-	-	12.79	0.68	0.5	est.	[1287]	
$F + HCl = HF + Cl$	-	-	12.28	0.68	0.6	-	[1287]	
$F + HNO = HF + NO$	-	-	11.38	1/2	0	-	[1287]	
$F + F_2O = F_2 + FO$	288-318	-	-	0	>15	photol. F_2O	[608]	
$F + CH_4 = HF + CH_3$	198-351	-	14.08+ ±0.07	0	1.21+ ±0.08	therm.	[548,549, 547]	552
$F + C_2H_6 = HF + C_2H_5$	198-351	-	13.777	0	0.28	-	[547]	233
$F + C_3H_8 = HF + CH_3CH_2CH_2$	213-293	-	13.52+ ±0.04	0	0±0.025	therm.	[548,549, 547]	552,554

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$F + C_3H_8 = HF + CH_3CHCH_3$	213-293	-	13.10± ±0.03	0	0 ± 0.025	therm.	[548,549,547]	552,554
$F + n\text{-}C_4H_{10} = HF + CH_2CH_2CH_2CH_3$	213-293	-	13.45± ±0.06	0	0 ± 0.07	therm.	[548,549,547]	552,554,555
$F + n\text{-}C_4H_{10} = HF + CH_3CHCH_2CH_3$	213-293	-	13.37± ±0.05	0	0 ± 0.065	therm.	[548,549,547]	552,554,555, 556
$F + iso\text{-}C_4H_{10} = HF + CH_2CH(CH_3)_2$	213-293	-	13.65± ±0.06	0	0 ± 0.07	therm.	[548,549,547]	552,554
$F + iso\text{-}C_4H_{10} = HF + (CH_3)_3C$	213-293	-	12.84± ±0.07	0	0 ± 0.08	therm.	[548,549,547]	552,554,555, 556
$F + (CH_3)_4C = HF + C_5H_{11}$	213-293	-	13.75± ±0.07	0	0 ± 0.08	therm.	[548,549,547]	552,554
$F + cyclo\text{-}C_3H_6 = HF + cyclo\text{-}C_3H_5$	213-293	-	13.45± ±0.10	0	0 ± 0.1	therm.	[548,549, 547]	552,554
$F + CF_3 = F_2 + CF_2$	1700-3000	-	12.0	1/2	55.6	shock, est.	[1133]	
$F + CF_4 = F_2 + CF_3$	1700-3000	-	12.0	1/2	85.63	shock, est.	[1133]	
$F + CH_2FCH_2CH_2CH_3 = HF + CHFCH_2CH_2CH_3$	293	<12.98	-	-	-	therm.	[581]	557
$F + CH_2FCH_2CH_2CH_3 = HF + CH_2FCHCH_2CH_3$	293	13.35	-	-	-	therm.	[581]	557
$F + CH_2FCH_2CH_2CH_3 = HF + CH_2FCH_2CHCH_3$	293	13.45	-	-	-	therm.	[581]	557

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$F + CH_2FCH_2CH_2CH_3 =$ $= HF + CH_2FCH_2CH_2CH_2$	293	13.45	-	-	-	therm.	[581]	557
$F + CH_2ClCH_2CH_2CH_3 =$ $= HF + CH_2ClC_2H_3CH_3$	294	13.68	-	-	-	therm.	[581]	557
$F + CH_2ClCH_2CH_2CH_3 =$ $= HF + CH_2ClCH_2CH_2CH_2$	294	13.45	-	-	-	therm.	[581]	557
$F + F + Ar = F_2 + Ar$	1700-3000	-	11.16_5	0	-12.115	shock, est.	[1133]	
$F + F + M = F_2 + M$	-	-	14.10_5	1/2	0	est.	[1287]	
$F + CF + Ar = CF_2 + Ar$	2600-3700	-	26.75±0.17	-2.85 ±0.62	0	shock	[1128]	
$F + CF_2 + Ar = CF_3 +$ $+ Ar$	1700-3000	-	46.17	-9.04	2.29	shock, est.	[1133]	
$F + CF_3 + Ar = CF_4 +$ $+ Ar$	1700-3000	-	31.99	-4.64	2.85	shock, est.	[1133]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Cl + H_2 = HCl + H$	210–300	-	-	0	5.8	photochem.	[1257]	
	251–456	-	$13.06_5 \pm 0.11$	0	4.3±0.2	dis. , flow		
	273	9.52	-	-	-	dis.	[1330]	
	298	9.91	-	-	-	"	"	
	298–308	-	-	0	5.9	photochem.	[768]	
	523	11.68±0.04	-	-	-	therm.	[43]	
	901–1071	-	13.8	0	5.9	"	[1436]	
	-	-	-	0	5.24	calc.	[1352]	
	-	-	14	0	5.5	-	[1287]	
	-	-	11.45	1/2	5.0	-	"	
	273–1071	-	13.92±0.03	0	5.48±0.14	-	[547]	558
	298–1000	-	13.9	0	5.5±0.2	-	[43]	"
	"	-	12.69	1/2	5.0	-	[43, 1712]	"
$Cl + HD = HCl + D$ = $DCl + H$	243–343	..	13.83±0.04	0	5.97±0.15	photol. Cl_2	1232,167,547	559
$Cl + D_2 = DCl + D$	243–343	-	13.76±0.05	0	6.61±0.16	photol. Cl_2	[1232]	560
	273 and 305	-	-	0	7.1	photochem.	[1334]	561
	303	-	-	-	-	photochem.	[521]	562
	303–451	-	14.02	0	6.67	"	[344]	563
	240–450	-	14.17±0.30	0	7.03±0.43	-	-	564
$Cl + HT = HCl + T$ = $TCl + H$	235–344	-	13.79±0.04	0	6.03±0.15	photochem.	[868]	565
	"	-	13.78	0	6.04±0.02	"	[868, 547]	
	243–343	-	13.82±0.04	0	6.28±0.15	photol. Cl_2	[1232]	566
$Cl + DT = DCl + T$ = $TCl + D$	243–343	-	13.73±0.03	0	6.90±0.14	photol. Cl_2	[1232]	567
$Cl + T_2 = TCl + T$	243–343	-	13.73	0	7.17±0.14	photol. Cl_2	[1232]	568
$Cl + Na_2 = NaCl + Na$	573	13.78	-	-	-	rare. fl.	[1250, 883]	
	573–623	14.18	-	-	-	"	[1249, 165]	
$Cl + O_3 = ClO + O_2$	294	≥11.6	-	-	-	photol. Cl_2, flow	[376]	
$Cl + F_2 = FCl + F$	-	-	13.88	0.67	0.3	est.	[1287]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Cl + Cl_3 = Cl_2 + Cl_2$	room	$\leq$14.23	-	-	-	dis.	[812, 811]	
$Cl + ClBr = Cl_2 + Br$	298-333	-	12.24±0.24	0	1.1±0.4	photochem.	[358]	569
$Cl + Br_2 = ClBr + Br$	293	11.35±0.12	-	-	-	photochem.	[358]	569
$Cl + ClI = Cl_2 + I$	303-333	-	11.7	0	4.5	photochem.	[359]	570
$Cl + HCl = Cl_2 +$	273-335	-	~14.26	0	49	-	[554]	571
$+ H - 45,1$	"	-	14.33	0	47.5	-	-	572
$Cl + NH = HCl + N$	-	-	12.34	0.68	0.2	est.	[1287]	
$Cl + NH_2 = HCl + NH$	-	-	11.71	1/2	0	-	[1287]	
$Cl + NH_3 = HCl + NH_2$	-	-	11.65	1/2	0.1	-	[1287]	
$Cl + NCl_2 = Cl_2 + NCl$	259-373	-	11.93±0.04	0	1.94	dis., flow	[365]	
$Cl + NCl_3 = Cl_2 + NCl_2$	293	$\geq$ 12.5	-	-	-	dis., flow	[365]	
$Cl + N_2O = ClO + N_2$	876-1031	-	14.11	0	33.5	therm.	[897]	
$Cl + HNO = HCl + NO$	-	-	11.40	1/2	0	-	[1287]	
$Cl + NOCl = Cl_2 + NO$	298-328	-	13.06±0.2	0	1.06±0.3	photol. Cl_2	[269]	
	"	-	11.59	1/2	0.75	"	[269, 1712]	
$Cl + ClO_2 = 2ClO$	294	$\geq$ 11.7	-	-	-	photol. Cl_2, flow	[376]	
$Cl + ClO_2 = Cl_2 + O_2$	room?	-	-	-	-	pulse photol.	[1181]	573
$Cl + Cl_2O = Cl_2 + ClO$	-	$\geq$ 11.6	-	-	-	-	[501]	
$Cl + COCl = Cl_2 + CO$	283-318	-	12.05	1/2	1.94	photochem.	[194]	574
	298-328	-	14.6	0	0.83	"	[268]	
	"	-	13.1	1/2	0.5	"	[268, 1712]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Cl + COCl_2 = Cl_2 + COCl$	283–313	–	12.94	1/2	23.04	photochem.	[194]	574
	298–328	–	13.5	1/2	20.5	"	[268, 1712]	575, R
$Cl + SO_2Cl_2 = Cl_2 + SO_2Cl$	383–413	–	9.93	1/2	~0	therm.	[1460]	
$Cl + CH_4 = HCl + CH_3$	193–593	–	13.40±0.07	0	3.83±0.20	photol. Cl_2	[949]	576
	293–484	–	13.43	0	3.83	"	[1276]	577
	293–488	–	13.33	0	3.78	therm., stat.	[1275]	578
	360–475	–	13.7	0	3.85	photochem.	[636, 346]	
	193–488	–	13.35±0.15	0	3.83±0.18	–	[949, 1275, 547]	
$Cl + CD_4 = DCl + CD_3$	304–461	–	13.73	0	5.76_5	photochem.	[344]	579
$Cl + C_2H_6 = HCl + C_2H_5$	193–593	–	13.97±0.06	0	1.06±0.08	photol. Cl_2	[949]	576
	349–563	–	14.10	0	0.98	"	[1276, 951]	577
	273–488	–	13.95±0.09	0	1.02±0.13	–	[547, 1275, 946]	580, R
$Cl + C_2D_6 = DCl + C_2D_5$	303–443	–	13.76	0	1.36	photochem.	[344]	581
$Cl + C_3H_8 = HCl + n\text{-}C_3H_7$	193–593	–	14.02_5±0.08	0	0.98±0.21_5	photol. Cl_2	[949]	576, 582
	"	–	14.00±0.08	0	0.98±0.13	"	[949, 547]	583
$Cl + C_3H_8 = HCl + iso\text{-}C_3H_7$	193–593	–	13.87±0.09	0	0.66±0.21_5	photol. Cl_2	[949]	576, 582
	"	–	13.85±0.09	0	0.66±0.13	"	[949, 547]	583
$Cl + C_3H_8 = HCl + C_3H_7$	298–484	–	14.26	0	0.65	photol. Cl_2	[1276, 951]	577
$Cl + n\text{-}C_4H_{10} = HCl + n\text{-}C_4H_9$	193–593	–	13.94±0.09	0	0.77±0.22	photol. Cl_2	[949]	576
	"	–	13.91±0.09	0	0.77±0.14	"	[949, 547]	583
$Cl + n\text{-}C_4H_{10} = HCl + iso\text{-}C_4H_9$	193–593	–	13.96±0.09	0	0.25±0.22	photol. Cl_2	[949]	576
	"	–	13.97±0.09	0	0.30±0.14	"	[949, 547]	583
	263–419	–	–	–	–	therm. + photochem.	[31]	584
	273–419	–	13.98±0.06	0	0.30±0.05	therm.	[581]	585

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
Cl + iso-C_4H_{10} = HCl +	193-593	-	14.08±0.09	0	0.80±0.22	photol. Cl_2	[949]	576
+ iso-C_4H_9	"	-	14.06±0.10	0	0.80±0.14	"	[949, 547]	583
	263-419	-	-	-	-	therm., photochem.	[31]	586
Cl + iso-C_4H_{10} = HCl +	193-593	-	13.24±0.11	0	0±0.23	photol. Cl_2	[949]	576
+ $(CH_3)_3C$	"	-	13.31±0.10	0	0.1±0.16	"	[949, 547]	583
	263-419	-	-	-	-	therm., photochem.	[31]	586
Cl + iso-C_4H_{10} = HCl + + C_4H_9	298-484	-	14.31	0	0.84	photol. Cl_2	[1276, 951]	577
Cl + $(CH_3)_4C$ = HCl +	193-593	-	14.24±0.09	0	0.90±0.22	photol. Cl_2	[949]	576
+ C_5H_{11}	"	-	14.22±0.09	0	0.90±0.14	"	[949 547]	583
	298-484	-	14.11	0	0.68	"	[1276, 951]	577
	193-593	-	14.22±0.04	0	0.88±0.05	-	-	587
Cl + cyclo-C_3H_6 = HCl+	193-593	-	13.75±0.08	0	4.12±0.22	photol. Cl_2	[949]	576
+ cyclo-C_3H_5	"	-	13.72±0.10	0	4.12±0.14	"	[949, 547]	583
Cl + cyclo-C_4H_8 = HCl+	193-593	-	14.42±0.09	0	0.80_5±0.22_5	photol. Cl_2	[949]	576
+ cyclo-C_4H_7	"	-	14.40±0.10	0	0.80±0.15	"	[949, 547]	583
Cl + cyclo-C_5H_{10} =	298-484	-	14.48	0	0.56	photol. Cl_2	[1276, 951]	577
HCl + cyclo-C_5H_9	"	-	14.37±0.12	0	0.58±0.20	"	[1276, 547]	583
Cl + CF_3H = HCl + CF_3	314-399	-	12.23	0	8.38±0.17	photol.	[404]	588
Cl + CH_3Cl = HCl +	286-593	-	13.52±0.06	0	3.3±0.1	photochem., therm.	[1276, 947]	
+ CH_2Cl	298-484	-	13.77	0	3.34	photol. Cl_2	[1276]	577, 589
	323-423	-	13.5	0	3.1	photo-Cl_2	[636, 346, 499]	
	273-484	-	13.58±0.05	0	3.28±0.20	-	[547]	590
Cl + CH_3Cl = Cl_2 + + CH_3	360-475	-	14.0	0	25.0	photo-Cl_2	[346, 499]	
Cl + CH_2Cl_2 = HCl +	273-563	-	13.43	0	3.0	photol. Cl_2	[947]	591
+ $CHCl_2$	"	-	13.41±0.07	0	2.96±0.10	photochem., therm.	[947, 547]	592
	360-475	-	13.4	0	3.1	photol. Cl_2	[346, 499]	
Cl + CH_2Cl_2 = Cl_2 + + CH_2Cl	360-475	-	14.0	0	21.4	photo-Cl_2	[346, 499]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Cl + CHCl_3 = HCl + CCl_3$	286-593	-	12.84±0.02	0	3.34±0.04	therm., photochem.	[947]	591
	"	-	12.84±0.04	0	3.32±0.09	"	[947, 547]	592, R
	360-430	-	-	-	-	photo-Cl_2	[347]	593
	360-475	-	13.2	0	3.35	"	[636,346,499]	
$Cl + CHCl_3 = Cl_2 + CHCl_2$	360-475	-	14.0	0	21.0	photo-Cl_2	[346, 499]	
$Cl + CDCl_3 = DCl + CCl_3$	253-453	-	12.70±0.08	0	4.05±0.13	photochem.	[1179]	594, 595
	"	-	12.66±0.18	0	4.0±0.2	"	[547]	596, 595, R
	304-461	-	13.28	0	4.71	"	[344, 636]	597
$Cl + CCl_4 = Cl_2 + CCl_3$	303-425	-	13.93	0	20.0	photo-Cl_2, from k_ and K	[499, 346, 638, 452]	
$Cl + CF_3Cl = Cl_2 + CF_3$	399-505	-	14.28	0	31.3	from k_ and K	[24]	
$Cl + CH_3I = CH_3Cl + I$	370-433	-	-	-	-	photol. CH_3I	[1617]	598
$Cl + CH_3I = HCl + CH_2I$	370-433	-	-	-	-	photol. CH_3I	[1617]	598
$Cl + C_2HF_5 = HCl + C_2F_5$	303-399	-	12.28±0.09	0	5.3±0.1	photol.	[404]	588
$Cl + C_2H_5Cl = HCl + CH_2ClCH_2$	303-453	-	13.05	0	1.5	photol. Cl_2	[362]	
$Cl + C_2H_5Cl = HCl + C_2H_4Cl$	273-488	-	13.51±0.16	0	1.50±0.25	photochem.	[547]	599
	298-484	-	13.68	0	1.47	"	[1276]	577
$Cl + C_2H_5Cl = HCl + CH_3CHCl$	303-453	-	13.55	0	1.5	photol. Cl_2	[362]	600
$Cl + C_2H_5Cl = Cl_2 + C_2H_5$	303-453	-	14.3	0	21.5	photo-Cl_2	[346, 499]	
$Cl + C_2H_4Cl = HCl + C_2H_3Cl$	654-740	-	13	0	3.0	therm.	[803]	601
$Cl + C_2H_4Cl_2 = HCl + CH_3CCl_2$	323-423	-	12.95	0	1.9	photol. Cl_2	[362]	602

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Cl + C_2H_4Cl_2 = HCl + CH_2CHCl_2$	303–453	-	13.00	0	3.4	photol. Cl_2	[362]	600
$Cl + C_2H_4Cl_2 = HCl + CHClCH_2Cl$	323–423	-	13.80	0	3.1	photol. Cl_2	[362]	602,600,603
	635–758	-	-	0	5	pyr. $(CH_2Cl)_2$	[106]	604
	"	-	11.62	0	5.0	"	[803]	605
$Cl + C_2H_4Cl_2 = Cl_2 + C_2H_4Cl$	303–453	-	14.3	0	21.3	photo-Cl_2	[346, 499]	
$Cl + CH_2ClCHCl = HCl + C_2H_2Cl_2$	635–758	-	-	0	3	pyr. $(CH_2Cl)_2$	[106]	604
$Cl + CH_3CCl_3 = HCl + C_2H_2Cl_3$	323–423	-	12.40	0	3.6	photol. Cl_2	[362]	602, 606
$Cl + CHCl_2CH_2Cl = HCl + CCl_2CH_2Cl$	323–423	-	12.95	0	3.1	photol. Cl_2	[362]	607
$Cl + CH_2ClCHCl_2 = HCl + CHClCHCl_2$	333–413	-	13.15	0	3.7	photol. Cl_2	[362]	607
$Cl + C_2H_3Cl_3 = Cl_2 + C_2H_3Cl_2$	323–423	-	14.3	0	20.6	photo-Cl_2	[346, 499]	
$Cl + CH_2ClCCl_3 = HCl + CHClCCl_3$	323–423	-	12.80	0	3.55	photol. Cl_2	[362]	607
$Cl + CHCl_2CHCl_2 = HCl + C_2HCl_4$	323–438	-	13.10	0	3.4	photol. Cl_2	[362]	607,1672
$Cl + C_2H_2Cl_4 = HCl + C_2HCl_4$	323–438	-	13.8	0	3.3	photo-Cl_2	[346]	
$Cl + C_2H_2Cl_4 = Cl_2 + C_2H_2Cl_3$	323–438	-	14.3	0	20.4	photo-Cl_2	[346, 499]	
$Cl + C_2HCl_4 \rightarrow$ products	497	-	13.85	-	-	-	[814]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Cl + C_2HCl_5 = HCl +$ -	336–421	-	12.65	0	3.55	photol. Cl_2	[362]	607
$+ C_2Cl_5$	360–490	-	12.8	0	3.3	"	[636]	
	433–497	-	12.8	0	3.3	photochem.	[636, 346]	
	273–583	-	12.68±0.13	0	3.4±0.2	-	[947, 636, 547]	608, R
$Cl + C_2HCl_5 = Cl_2 +$	433–497	-	13.8±0.5	0	17.9±1.0	photochem.	[814]	
$+ C_2HCl_4$								
$Cl + C_2Cl_6 = Cl_2 +$	360–480	-	14.3	0	19.5	photochem.	[636]	609
$+ C_2Cl_5$								
$Cl + CH_2F(CH_2)_2CH_3 =$	273–419	-	13.38±0.18	0	0.77±0.10	therm.	[581]	585
$= HCl + CHF(CH_2)_2CH_3$	273–503	-	13.0	0	0.8	photol., stat.	[598]	610
$Cl + CH_2F(CH_2)_2CH_3 =$	273–419	-	13.54±0.20	0	0.62±0.15	therm.	[581]	585
$= HCl + CH_2FCHCH_2CH_3$	273–503	-	13.1	0	0.6	photol., stat.,	[598]	610
$Cl + CH_2F(CH_2)_2CH_3 =$	273–419	-	13.69±0.16	0	0.37±0.10	therm.	[581]	585
$= HCl + CH_2FCH_2CHCH_3$	273–503	-	13.3	0	0.3	est.	[598]	
$Cl + CH_2F(CH_2)_2CH_3 =$	273–419	-	13.62	0	0.77	therm., est.	[581]	
$= HCl + CH_2F(CH_2)_3$	273–503	-	13.1	0	0.8	photol., stat.	[598]	610
$Cl + CH_2Cl(CH_2)_2CH_3 =$	308–419	-	13.35±0.15	0	0.77±0.20	therm.	[581]	585
$= HCl + CHCl(CH_2)_2CH_3$								
$Cl + CH_2Cl(CH_2)_2CH_3 =$	308–419	-	13.31±0.17	0	0.3±0.4	therm.	[581]	585
$= HCl + CH_2ClCHCH_2CH_3$								
$Cl + CH_2Cl(CH_2)_2CH_3 =$	308–419	-	13.65±0.17	0	0.22±0.10	therm.	[581]	585
$= HCl + CH_2ClCH_2CHCH_3$								
$Cl + CH_2Cl(CH_2)_2CH_3 =$	308–419	-	13.62	0	0.77	therm., est.	[581]	
$= HCl + CH_2Cl(CH_2)_3$								
$Cl + CH_2Br(CH_2)_2CH_3 =$	308 and 351	-	-	-	-	therm.	[581]	557
$= HCl + CHBr(CH_2)_2CH_3$								

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Cl + CH_2Br(CH_2)_2CH_3 =$ $= HCl + CH_2BrCH_2CHCH_3$	308 and 351	-	-	-	-	therm.	[581]	557
$Cl + CH_2Br(CH_2)_2CH_3 =$ $= HCl + CH_2BrCH_2CH_2CH_2$	308 and 351	-	-	-	-	therm.	[581]	557
$Cl + CF_3CH_2CH_2CH_2CH_3 =$ $= HCl + CF_3CHCH_2CH_2CH_3$	273-503	-	12.2	0	2.0	photol., stat.	[598]	610
$Cl + CF_3CH_2CH_2CH_2CH_3 =$ $= HCl + CF_3CH_2CHCH_2CH_3$	273-503	-	13.0	0	0.6	photol., stat.	[598]	610
$Cl + CF_3CH_2CH_2CH_2CH_3 =$ $= HCl + CF_3CH_2CH_2CH_2CH_2$	273-503	-	12.8	0	0.5	photol., stat.	[598]	610
$Cl + Cl = Cl_2 + h\nu$	1750	-	-	-	-	shock	[1215]	611
$Cl + Cl + He = Cl_2 + He$	room	15.48	-	-	-	dis., flow	[75]	
$Cl + Cl + Ar = Cl_2 +$ $+ Ar$	195-500	-	14.3	0	-1.8±0.7	dis., flow	[380]	
	"	-	23.0±1.2	-3.0± ±0.5	0	"	[383, 380]	
	294	-	-	-	-	"	[382]	
	room	15.62±0.08	-	-	-	"	[812]	
	298	15.64±0.06	-	-	-	"	[380]	612
	313	15.60	-	-	-	"	[75]	
$Cl + Cl + Cl_2 = Cl_2 +$ $+ Cl_2$	195-500	-	15.1	0	-1.6±0.6	dis.	[380, 383]	
	195-500	-	23.0±1.2	-2.7± ±0.5	0	dis., flow	[383, 380]	
	room	14.48±0.40	-	-	-	dis.	[1018]	613, 614
	"	16.31	-	-	-	"	[811]	615
	"	16.43	-	-	-	dis., flow	[75]	
	298	16.29±0.06₅	-	-	-	dis.	[380]	612
	313	16.46	-	-	-	dis., flow	[75]	
	"	17.81±0.03	-	-	-	photol.	[62]	
	335	17.85±0.03	-	-	-	"	"	
	500	~16.3	-	-	-	photo-Cl_2	[1057]	
	502	15.9±0.5	-	-	-	photol.	[345]	616

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	552	15.85±0.5	-	-	-	photol.	[345]	
	599	15.70±0.5	-	-	-	"	"	
	300-600	-	21.90±0.62	-2.22±0.24	0	-	-	617
$Cl + Cl + M = Cl_2 + M$	1550-2650	-	$21.47+lg(1-e^{-\frac{813}{T}})$	-2	0	shock	[775]	618
	1600	15.40	-	-	-	"	"	"
	2000	15.36	-	-	-	"	[1485, 1542]	619
	2200	15.09	-	-	-	"	"	"
$Cl + Hg + CF_3Cl = HgCl + CF_3Cl$	343-383	≥ 12	-	0	~ -1.2	Hg photo.	[801]	
$Cl + Cl_2 \rightarrow Cl_3$	room	7.96	-	-	-	dis.	[812, 811]	
$Cl + CO + Ar = ClCO + Ar$	800	14.5±0.3	-	0	~ 2	dis.	[364]	
$Cl + CO \rightarrow COCl$	298-328	~ 11.8	-	0	~ 0	photol. Cl_2	[268]	
$Cl + NO + He = NOCl + He$	293	16.54±0.06	-	-	-	dis.	[364]	
$Cl + NO + Ar = NOCl + Ar$	270-620	-	-	0	-1.1±0.1	dis.	[364]	
	293	16.45±0.08	-	-	-	"	"	
	471	15.64±0.10	-	-	-	therm.	[47]	
$Cl + NO + H_2 = NOCl + H_2$	478-684	-	14.57	0	- 2.6	therm.	[50]	620
$Cl + NO + N_2 = NOCl + N_2$	293	16.54±0.06	-	-	-	dis.	[364]	
	471	15.85±0.12	-	-	-	therm.	[47]	
$Cl + NO + NO = NOCl + NO$	471	16.01±0.08	-	-	-	therm.	[47]	
$Cl + NO + O_2 = NOCl + O_2$	298	16.59±0.06	-	-	-	dis.	[364]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Cl + NO + Cl_2 = NOCl + Cl_2$	298	$16.52_5 \pm 0.06_5$	-	-	-	dis.	[364]	
	293–620	-	16.00	0	-0.7 ± 0.2	"	"	
	430–573	-	14.95	0	-2.6 ± 1	therm.	[47]	
	471	16.19 ± 0.09	-	-	-	"	"	
	290–620	-	19.68 ± 1.86	-1.29 ± 0.70	0	-	-	621
$Cl + NO + CO_2 = NOCl + CO_2$	471	16.19 ± 0.11	-	-	-	therm.	[47]	
$Cl + NO + N_2O = NOCl + N_2O$	471	15.55 ± 0.12	-	-	-	therm.	[47]	
$Cl + NO + SF_6 = NOCl + SF_6$	270–620	-	-	0	-1.2 ± 0.2	dis.	[364]	
	298	16.54 ± 0.05	-	-	-	"	"	
$Cl + O_2 + Ar = ClO_2 + Ar$	300	<15.3	-	-	-	photol. Cl_2, flow	[376]	
$Cl + O_2 + M = ClO_2 + M$	295	16.84	-	-	-	dis.	[889]	622
	room?	$14.78_5 \pm 0.08$	-	-	-	pulse photol.	[1181]	623
$Cl + CH_3 \rightarrow CH_3Cl$	360–475	-	14.6	0	0	photo-Cl_2	[499]	
$Cl + CH_2Cl \rightarrow CH_2Cl_2$	360–475	-	14.4	0	0	photo-Cl_2	[499]	
$Cl + CHCl_2 \rightarrow CHCl_3$	360–475	-	14.35	0	0	photo-Cl_2	[499]	
$Cl + CCl_3 \rightarrow CCl_4$	303–425	-	13.8	0	0	photo-Cl_2	[452]	
	"	-	14.38	0	0.95	"	"	624
	"	-	14.4	0	0	"	[499]	
$Cl + C_2H_5 \rightarrow C_2H_5Cl$	303–443	-	14.3	0	0	photo-Cl_2	[499]	
$Cl + C_2H_4Cl \rightarrow C_2H_4Cl_2$	303–453	-	14.3	0	0	photo-Cl_2	[499]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Cl + C_2H_3Cl_2 \rightarrow C_2H_3Cl_3$	329–423	-	14.3	0	0	photo-Cl_2	[499]	
$Cl + C_2H_2Cl_3 \rightarrow C_2H_2Cl_4$	323–423	-	14.3	0	0	photo-Cl_2	[499]	
$Cl + C_2HCl_4 \rightarrow C_2HCl_5$	497	13.85±1.0	-	-	-	photochem.	[814]	625
$Cl + C_2Cl_5 \rightarrow$ products	360–480	-	14.03	0	0.06	photochem.	[636,346,499]	
$Cl + C_2H_4 = C_2H_4Cl$	310	13.6	-	-	-	photo-Cl_2	[580]	626
$Cl + C_2H_4 + Cl_2 =$ $= C_2H_4Cl + Cl_2$	310	18.21	-	-	-	photo-Cl_2	[580]	626, 627
$Cl + C_2H_4 \rightarrow C_2H_4Cl$	298–321	-	13.2	0	0	photol. Cl_2	[65]	628, 629
	310	-	13.6	-	-	"	[580]	
$Cl + C_2H_3Cl \rightarrow C_2H_3Cl_2$	298–328	-	13.2	0	0	photol. Cl_2	[65]	628, 629
	"	-	12,50$_4$	0	1.0	photochem.	[64, 547,431]	630
	303–354	-	13,3±0.6	0	1.5±1.0	"	[63]	
	"	-	12.3	0	0	"	[65]	631
$Cl +$ cis-1.2-$C_2H_2Cl_2 \rightarrow$ $\rightarrow C_2H_2Cl_3$	303–354	-	13.3±0,6	0	1.5±1.0	photol. Cl_2, est.	[63]	
	"	-	12.3	0	0	photochem.	[65]	631
	308–406	-	13.89±0.11	0	0.19±0.12	"	[950]	632
	312–335	-	13,3±0,4	0	1.2±0.7	photochem.	[62]	
	-	-	12.4	0	0,95	"	[64, 547]	630, 633
	-	-	13.46	0	1,6	"	[499]	186
$Cl +$ trans-1,2-$C_2H_2Cl_2 \rightarrow$	308–406	-	13.47±0.11	0	-0.17±0.15	photochem.	[950]	
$Cl + C_2HCl_3 \rightarrow C_2HCl_4$	303–354	-	13.3±0,6	0	1,5±1.0	photol. Cl_2	[63]	
	"	-	12.3	0	0	"	[65]	631
	353–413	-	12,6±0,5	0	0,7±0,7	photochem.	[64, 430]	630
	413	11.48	-	-	-	est.	[430]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	433 and 452	12.75±0.3	-	-	-	photochem.	[814]	
$Cl + C_2Cl_4 \rightarrow C_2Cl_5$	357-477	-	12.4	0	0	photochem.	[636]	630, 634
	"	-	12.18±0.14	0	0±0.2	-	[947,636,547]	635
	358-563	-	11.4	0	0.5	photochem.	[638]	
	366-385	-	10.48	0	-2.32	photo-Cl_2	[3]	636
	382-476	-	11.81	0	-0.465	photochem.	[344, 636]	
	382-476	-	11.93	0	-0.22	"	[344]	637, R

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Br + H_2 = HBr + H -$	423–483	-	12.06	1/2	17.5	photochem.	[937]	
$- 16.6$	499–574	-	13.86	0	17.64	therm., photochem.	[200, 198]	
	"	-	12.77	1/2	18.8±0.2	therm.	[198, 233]	638
	549–612	-	12.33	1/2	18.0±0.7	"	[69, 233]	639
	570	6.71	-	-	-	"	[937]	
	600–1470	-	12.31	1/2	17.28	"	[1000]	
	970–1300	-	14.24	0	19.2	comp.	[1409]	
	1300–1700	-	12.55	1/2	18.3±1.8	shock	[233]	
	1396	10.98	-	-	-	"	[235]	
	1441	10.93	-	-	-	"	"	
	500–1700	-	12.52_4	1/2	18.3±0.1	-	[233]	640
	423–1700	-	14.25±0.09	0	19.295± ±0.250	-	-	641
$Br + D_2 = DBr + D$	549–653	-	13.92	0	19.87	therm.	[69]	
	"	-	12.28_5	1/2	19.7±0.3	"	[69, 233]	642
	"	-	13.88±0.28	0	20.3±0.8	"	[69, 547]	"
	1300–1700	-	12.28	1/2	19.8±0.9	shock	[233]	
	549–1700	-	12.26_4	1/2	19.7±0.1	-	[69, 233]	
	550–1700	-	13.94±0.02	0	20.42±0.06	-	-	643
$Br + Na_2 = NaBr + Na +$	571	13.78	-	-	-	rare. fl.	[1206]	
$+ 70.2 \pm 3.4$	573–623	14.17	-	-	-	"	[1249, 165]	
$Br + Cl_2 = ClBr + Cl -$ $- 5.7$	293–333	-	12.6±0.2	0	6.9±0.4	photochem.	[358]	569
$Br + ClBr = Br_2 + Cl -$ $- 6.0$	293	6.53	-	-	-	photochem.	[358]	569
$Br + HBr = Br_2 + H -$	303–575	-	13.9	0	41.7	photochem.	[196, 147]	
$- 41.3$	"	-	12.13	1/2	41.8	photochem., from k_ and K	[1712]	
	1300–1700	-	12.91	1/2	44.5	shock	[233]	
	300–1700	-	14.25±0.17	0	$43.15\pm$ $\pm 0.40_5$	-	-	644
$Br + N_2O = BrO + N_2 +$	793–868	-	-	0	35.0	therm.	[1559]	
$+ 16.6$	876–973	-	14.30	0	37.0	"	[897]	
$Br + CH_3 = HBr + CH_2 +$ $+ 1.7 \pm 7$	-	-	13.5	0	7.6	est.	[147]	
$Br + CH_4 = HBr + CH_3$	396–581	-	13.14_6	0	17.3	photochem.	[403, 1466]	233

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	396-581	-	13.99 ± ± 0.05	0	18.58±0.14	photochem.	[25]	645
$Br + CH_4 = HBr + CH_3$ - - 15 ± 2	423-503	-	13.7	0	18.3	photochem.	[937]	
	"	-	12.17	1/2	17.8	"	"	
	"	-	13.34	0	17.3	"	[405]	646
	423-570	-	13.75±0.15	0	18.18±0.5	therm., photochem.	[937, 547]	647, 648
	477-614	-	14.0	0	18.3	therm.	[550]	649, 650
	570	6.81	-	-	-	"	[937]	
$Br + C_2H_6 = HBr +$ $+ C_2H_5$ - 10 ± 1	308-363	-	-	0	13.3±0.5	photochem.	[1122]	
	312-394	-	13.88±0.19	0	13.26±0.55	"	[403]	651
	"	-	14.13_5± ± 0.05_6	0	13.26±0.14	"	[403, 1466, 550, 25]	652
	331-472	-	13.895± ±0.035	0	13.40±0.09	therm.	[550]	653
	"	-	13.86±0.07	0	13.2±0.27	"	[550, 547]	647, 654
$Br + C_3H_8 = HBr +$ $+ CH_3CHCH_3$	285-418	-	13.71±0.07	0	10.15±0.14	therm.	[550,548,549]	650
	"	-	13.68±0.13	0	9.95±0.35	"	[550, 547]	647
	"	-	13.96±0.06_6	0	10.41 ± ± 0.15	"	[550, 25]	652
$Br + n\text{-}C_4H_{10} = HBr +$ $+ n\text{-}C_4H_9$	313-503	-	13.1	0	13.4	-	[598]	656
	400	-	-	-	-	therm.	[581]	557, 655
$Br + n\text{-}C_4H_{10} = HBr +$ $+ C_2H_5CHCH_3$	267-371	-	13.22±0.14	0	10.22_5± ±0.23_5	therm.	[550, 548, 549]	650
	"	-	14.21_4	0	10.03±0.4	"	[550, 547]	647, 657
	285-418	-	14.46±0.08_4	0	10.49±0.17	"	[550, 25]	652
	"	-	13.6	0	10.2	photochem., stat.	[598]	658
	419	-	-	-	-	therm.	[31, 581]	659
$Br + iso\text{-}C_4H_{10} =$ $= HBr + (CH_3)_3C$	285-418	-	13.58±0.08	0	7.77±0.16	therm.	[550, 25]	652
	307-421	-	13.30±0.11	0	7.51±0.20	"	[550, 548, 549]	650,660,661
	"	-	13.29	0	7.51±0.40	"	[550, 547]	647
	313-368	-	17.6	0	11.7	photochem., therm.	[500]	662
$Br + (CH_3)_4C = HBr +$ $+ (CH_3)_3CCH_2$	285-418	-	14.48±0.06	0	14.46±0.15	therm.	[550, 25]	652
	330-473	-	14.244± ±0.061	0	14.289± ±0.132	"	[548, 549, 550]	650, 661
	330-473	-	14.24±0.13	0	14.09±0.26	"	[547, 550]	647, 668
	470	-	-	-	-	"	[1384]	664

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Br + C_6H_5CH_3 = HBr + C_6H_5CH_2$	355–439	-	13.52	0	7.2±0.6	photochem. and therm.	[28]	
$Br + C_6H_5CH_2D = HBr + C_6H_5CHD$	393–433	-	-	-	-	therm.	[1504]	665
$Br + CH_3OH = HBr + CH_2OH$	349–389	-	10.42	1/2	6.2	photochem.	[253]	666
$Br + C_2H_5OH = HBr + CH_3CHOH$	343–423	-	-	0	2.6±2.0	photochem.	[1468]	666
$Br + (tert-C_4H_9O)_2 = HBr + C_4H_8OOC_4H_9$	413	-	-	0	17	est.	[122]	
$Br + CH_3F = HBr + CH_2F$	396–581	-	13.50±0.18	0	15.70 ± 0.54	photochem.	[1466]	667
	"	-	13.74±0.05	0	16.10± 0.14	"	[1466, 25]	652
$Br + CH_2F_2 = HBr + CHF_2$	398–573	-	13.13±0.17	0	16.2±0.5	photochem.	[1466]	668
	"	-	13.37±0.05	0	16.58_5 ± 0.14	"	[1466, 25]	652
$Br + CHF_3 = HBr + \dot{C}F_3$	494–684	-	12.90±0.20	0	21.94 ± 0.64	photochem.	[1466]	669
	548–633	-	13.46	0	23.5±1.0	photochem.	[405]	
	634–704	-	13.46	0	23.5±1.0	therm.	"	
	"	-	13.11±0.04	0	22.32 ± 0.11	"	[25]	
	494–684	-	12.99±0.17	0	22.25 ± 0.46	-	-	670
$Br + CH_3Cl = HBr + CH_2Cl$	285–418	-	13.86±0.06	0	14.72 ± 0.16	therm.	[550, 25]	652
	332–478	-	13.616 ± 0.057	0	14.451 ± 0.156	"	[550]	650
	"	-	13.57±0.14	0	14.25 ± 0.35	"	[547, 550]	647
$Br + CHCl_3 = HBr + CCl_3$	383 and 403	-	-	-	10 ± 1	photochem.	[222]	
	420–455	-	12.36	0	9.3±0.6	therm.	[1453]	
	"	-	10.82	1/2	8.86	"	[1453, 1712]	
$Br + CH_3Br = Br_2 + CH_3$	-	-	9.7	0	10.2	est.	[147]	
$Br + CH_3Br = HBr + CH_2Br$	423–508	-	12.18	1/2	15.6	photochem.	[937]	
	"	-	13.7	0	16.1	-	[147, 937]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	570	7.62	-	-	-	therm.	[937]	
	423-570	-	13.7±0.3	0	15.85 ± 0.60	-	[547, 937]	671
	"	-	14.00±0.06	0	16.31±0.17	therm.	[25]	652, R
$Br + CH_3Br = Br_2 + CH_3$	423-503	-	13.7	0	22.9	-	[147, 937]	
$Br + CH_2Br_2 = Br_2 + CH_2Br$	-	-	14.0	-	-	est.	[147]	
$Br + CBr_4 = CBr_3 + Br_2$	443-473	-	-	0	0	therm.	[790]	672
$Br + CCl_3Br = Br_2 + CCl_3$	383 and 403	-	-	0	6	photochem.	[222]	
	419-456	-	13.90	0	10.3	therm.	[441]	672
	"	-	12.37	1/2	9.76	"	[441, 1712]	
	420-455	-	13.91±0.15	0	10.2±0.3	"	[1453]	
$Br + CF_3Br = Br_2 + CF_3$	451-600	-	13.8±0.5	0	24.3±2.0	from k_- and K	[24]	
$Br + C_2H_5F = HBr + CH_3CHF$	309-394	-	12.89±0.22	0	11.19±0.63	photochem.	[403]	673
	"	-	13.12±0.08	0	11.59 ± 0.17	"	[403, 25]	652
$Br + CH_3CHF_2 = HBr + CH_3CF_2$	369-503	-	13.12±0.17	0	14.15 ± 0.53	photochem.	[403]	673
	"	-	13.36±0.05	0	14.55 ± 0.14	"	[403, 25]	652
$Br + CH_3CF_3 = HBr + CH_2CF_3$	516-655	-	13.78±0.27	0	23.08 ± 0.78	photochem.	[403]	673
	"	-	14.01± ±0.04₄	0	23.46 ± 0.18	"	[403, 25]	652
$Br + CF_3CH_2F = HBr + CF_3CHF$	403-595	-	13.35±0.20	0	19.09 ± 0.61	photochem.	[403, 1466]	673
	"	-	13.59±0.06	0	19.50 ± 0.16	"	[403, 25]	652
$Br + CF_2HCF_2H = HBr + CF_2CF_2H$	391-556	-	13.35±0.24	0	18.94 ± 0.62	photochem.	[403, 1466]	673
	"	-	13.60±0.06	0	19.35 ± 0.16	"	[403, 25]	652
$Br + C_2F_5H = HBr + C_2F_5$	494-684	-	12.80±0.19	0	18.90± ± 0.59	photochem.	[1466]	673
	596-731	-	13.03±0.02	0	19.30_5 ± 0.06	therm.	[25]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Br + C_2H_5Br = Br_2 + C_2H_5$	-	-	-	0	24.9	-	[147]	
$Br + C_2H_2Cl_2Br_2 = Br_2 + C_2H_2Cl_2Br$	363-403	-	-	0	~11	photochem.	[1166]	
$Br + C_2F_5CF_2H = HBr + C_3F_7$	526-655	-	12.68±0.19	0	18.65±0.58	photochem.	[403]	678
	"	-	12.95±0.05	0	19.08±0.14	"	[403, 25]	652
$Br + CH_2FCH_2CH_2CH_3 = HBr + CHFCH_2CH_2CH_3$	335-458	-	13.2	0	11.6	photol., stat.	[598]	674
$Br + CH_2FCH_2CH_2CH_3 = HBr + CH_2FCHCH_2CH_3$	335-458	-	13.1	0	11.5	photol., stat.	[598]	674
$Br + CH_2FCH_2CH_2CH_3 = HBr + CH_2FCH_2CHCH_3$	335-458	-	13.6	0	10.2	photol., stat.	[598]	
$Br + CH_2FCH_2CH_2CH_3 = HBr + CH_2FCH_2CH_2CH_2$	335-458	-	13.0	0	13.0	photol., stat.	[598]	674
$Br + CH_2ClCH_2CH_2CH_3 = HBr + CHClCH_2CH_2CH_3$	419	-	-	-	-	therm.	[581]	675
$Br + CH_2ClCH_2CH_2CH_3 = HBr + CH_2ClCHCH_2CH_3$	419	-	-	-	-	therm.	[581]	675
$Br + CH_2ClCH_2CH_2CH_3 = HBr + CH_2ClCH_2CHCH_3$	419	-	-	-	-	therm.	[581]	675
$Br + CH_2ClCH_2CH_2CH_3 = HBr + CH_2ClCH_2CH_2CH_2$	419	-	-	-	-	therm.	[581]	675
$Br + CF_3CH_2CH_2CH_2CH_3 = HBr + CF_3CH_2CHCH_2CH_3$	313-503	-	13.2	0	11.0	photol., stat.	[598]	674
$Br + CF_3CH_2CH_2CH_2CH_3 = HBr + CF_3CH_2CH_2CH_2CH_2$	313-503	-	13.1	0	13.0	photol., stat.	[598]	674
$Br + (CH_3)_3CBr = Br_2 + (CH_3)_3C$	313-368	-	13.2	0	23.7	photochem.	[500, 147]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Br + CF_3CH_2CH_2CH_2CH_3 =$ $= HBr + CF_3CH_2CHCH_2CH_3$	335–458	-	13.2	0	11.0	photol., stat.	[598]	
$Br + CF_3CH_2CH_2CH_2CH_3 =$ $= HBr + CF_3CH_2CH_2CHCH_3$	335–458	-	13.6	0	10.2	photol., stat.	[598]	
$Br + CF_3CH_2CH_2CH_2CH_3 =$ $= HBr + CF_3CH_2CH_2CH_2CH_2$	335–458	-	13.1	0	13.0	photol., stat.	[598]	
$Br + (CH_3)_3CCH_2Br =$ $= Br_2 + (CH_3)_3CCH_2$	371–425	-	10.2	0	23.2	photochem., est.	[800, 147]	
$Br + CF_3CHO = HBr +$ $+ CF_3CO$	-	-	12.45±0.08	0	6.6±0.2	-	[21]	
$Br + Br = Br_2 + h\nu$	1300–2300	-	-	-	-	shock	[1214]	
$Br + Br + He = Br_2 + He$	294	15.13±0.01	-	-	-	photol.	[1298]	676
	"	15.15	-	-	-	"	[1297]	
	363±20	14.87±0.17	-	-	-	pulse photol.	[267]	
	490	14.67	-	-	-	photol.	[772]	677
	1600	14.50	-	-	-	shock	[232]	
	300-1600	-	17.29	-0.87	0	-	[1298, 1297, 232]	
$Br + Br + Ar = Br_2 + Ar$	273–418	-	14.28	0	-1.4	pulse photol.	[629]	678
	"	-	17.88	-1.06	0	"	"	
	293	15.36±0.10	-	-	-	photol.	[1301]	
	"	15.37	-	-	-	"	[1297]	
	room	15.48±0.03	-	-	-	pulse photol.	[267a]	
	298	15.57±0.02	-	-	-	"	[1442]	
	"	15.41_5±0.01_5	-	-	-	"	[819]	679
	"	15.38	-	-	-	-	[285]	
	298–433	-	14.16	0	-1.93	pulse photol.	[1442]	
	300	15.48	-	-	-	"	[116]	
	490	14.04	-	-	-	photol.	[772]	677
	950	14.91±0.06	-	-	-	pulse photol. + shock	[270]	
	1150	14.43±0.05	-	-	-	pulse photol.	[819]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	1810–2225	–	26.08	-3.5 ± 0.5	0	shock, from k_- and K	[1218]	
	1850–2400	–	−98.03	$71.51(1-0.16\ \lg T)$	0	"	[212b]	
	1400–2700	–	14.32	0	−1.45	shock	[236]	680
	"	–	18.35	−1.19	0	"	"	
	1500	14.48 ± 0.07	–	–	–	"	[233]	
	"	14.58	–	–	–	"	[235]	
	1600	14.40 ± 0.07	–	–	–	"	[233]	
	298–2300	–	19.35	−1.60	0	–	[987, 819]	
	273–2225	–	14.28	0	−1.4	–	[629]	681
	298–1700	–	14.22	0	−1.84	–	[233]	682
	298–2225	–	$20.26-\lg(1-e^{-\frac{465}{T}})$	−1.97	0	–	[1218]	683
	273–2700	–	14.30 ± 0.06	0	-1.51 ± 0.12	–	–	684
	"	–	18.38 ± 0.23	-1.21 ± 0.08	0	–	–	"
$Br + Br + Br = Br_2 + Br$	1600	15.59 ± 0.11	–	–	–	shock	[232]	
	1600–2240	–	38.94_4	−7.3	0	shock, from k_- and K	[212b]	
	1000–2985	–	42.23	−8.4	0	"	[212b, 212a]	
$Br + Br + H_2 = 2HBr$	273 and 298	–	11.42 ± 0.52	0	0 ± 0.8	photochem.	[1452]	
$Br + Br + H_2 = Br_2 + H_2$	293	15.59 ± 0.1	–	–	–	photol.	[1301, 1297]	
	492	15.10	–	–	–	"	[772]	677
$Br + Br + N_2 = Br_2 + N_2$	293	15.65 ± 0.07	–	–	–	photol.	[1301, 1297]	
	298	15.53 ± 0.04	–	–	–	pulse photol.	[1442]	
	490	14.91	–	–	–	photol. Br_2	[772]	677
	1600	14.36	–	–	–	shock	[232]	
	290–1600	–	19.75	−1.68	0	–	–	685
$Br + Br + O_2 = Br_2 + O_2$	293	15.76 ± 0.08	–	–	–	photol.	[1301, 1297]	
	300–431	–	15.04	0	−1.2	pulse photol.	[1442]	686
	"	–	20.89	−2	0	"	"	
	1600	14.72_4	–	–	–	shock	[232]	

Reaction	T^oK	lg k	lg A	n	E	Method	Literature	Remarks
$Br + Br + Cl_2 = Br_2 + Cl_2$	293	16.18	-	-	-	photol.	[358]	569
$Br + Br + Br_2 = Br_2 + Br_2$	273-418	-	15.75	0	-2.3	pulse photol.		687
	293	16.68	-	-	-	photol.	[358]	569
	"	16.69	-	-	-	pulse photol.	[116]	
	room	<16.7	-	-	-	"	[270]	
	"	16.61±0.14	-	-	-	"	[267a]	
	490	15.41	-	-	-	photol. Br_2	[772]	677
	1000-2985	-	32.55_7	-5.6	0	shock, from k_ and K	[212a, 1218]	
	1220-1610	-	14.45	0.1	-2.01	shock	[305]	
	"	-	27.99	-4	0	"	"	
	1500	15.46±0.15	-	-	-	shock	[233]	
	1600	15.37±0.18	-	-	-	"	"	
	"	≤15.43	-	-	-	"	[236]	
	"	15.47_7	-	-	-	"	[232]	
	"	14.78_2	-	-	-	"	[1218]	
	273-2225	-	14.47_7	0	-4.13	-	[629]	688
	273-2225	-	25.98	-3.46	0	-	[629]	688
	290-1610	-	21.10±0.35	-1.785 ±0.12	0	-	-	689
	"	-	15.12±0.07	0	-2.18±0.17	-	-	"
$Br + Br + HCl = Br_2 + HCl$	490	15.67	-	-	-	photol. Br_2	[772]	
$Br + Br + HBr = Br_2 + HBr$	490	15.82	-	-	-	photol. Br_2	[772]	677
	1500	14.6	-	-	-	shock	[233]	690
$Br + Br + CO = Br_2 + CO$	490	15.80	-	-	-	photol. Br_2	[772]	677
	1600	14.32_2	-	-	-	shock	[232]	
$Br + Br + CO_2 = Br_2 + CO_2$	293	15.99±0.04	-	-	-	photol.	[1301, 1297]	
	300	15.89	-	-	-	pulse photol.	[629]	
	303-383	-	-	0	~-2.0	"	"	
	1600	14.62	-	-	-	shock	[232]	
	300-1600	-	20.39	-1.8	0	-	-	691

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Br + Br + CH_4 = Br_2 + CH_4$	293	15.81±0.07	-	-	-	photol.	[1301, 1297]	
$Br + Br + (CH_3)_4C = Br_2 + (CH_3)_4C$	471	-	-	-	-	photochem.	[1384, 800]	692
$Br + Br + M = Br_2 + M$	500	15.76	-	-	-	photol. Br_2	[870]	693
	950	14.91±0.06	-	-	-	pulse photol., shock	[270]	694
	1300-1800	-	13.844	0	-6.44±2.3	shock	[232]	695
	1370-1880	-	13.63_9	-	-6.34±0.8	"	"	696
	1380-1622	-	13.88_5	0	-5.83±2.98	"	"	697
	1400-1732	-	13.30	0	-7.8±1.3	"	"	698
	1422	$14.83_5 \pm 0.02_3$	-	-	-	"	"	695
	1469-1915	-	13.41	0	-7.97±1.10	"	"	699
	1474	$14.68_6 \pm 0.08$	-	-	-	"	"	697
	1565	14.39	-	-	-	"	"	698
	1641	14.48_5	-	-	-	"	"	696
	1640-1910	-	12.22_2	0	-15.4±1.8	shock	[232]	700
	1661	14.46	-	-	-	"	"	669
$Br + C_2F_4 \rightarrow C_2F_4Br$	970-1300	-	9.84	1	2.5	comp.	[1409]	225
$Br + C_2H_2Cl_2 \rightarrow C_2H_2Cl_2Br$	363-403	-	-	0	~0	photochem.	[1166]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
I + para-H_2 = ortho-H_2+ + I	698-758	-	8.18	0	0	therm.	[1447]	
I + H_2 = HI + H - - 32.8$_5$ ± 0.1	633-738	-	12.75±0.22	1/2	38.44± ±0.70	therm.	[1338, 1446]	
	"	-	14.38±0.22	0	34.11± ±0.70	"	1446, 948	
	667-800	-	12.55±0.07	1/2	32.8±0.25	"	[1449]	
	978	6.66	-	-	-	"	[799, 659]	
	-	-	-	0	37.2	-	[1388]	701
	-	-	-	0	33.0	calc.	[1352]	
	-	-	-	0	38	-	[1148]	702
	600-1000	-	14.14±0.07	0	33.85± ±0.23	-	-	703
I + I + H_2 = 2HI + 37.5	418-737	-	13.82±0.08	0	5.81± ±0.085	therm., photochem.	[1451]	
I + D_2 = DI + D	633-800	-	12.41±0.10	1/2	33.77± ±0.30	therm., stat.	[1450]	
I + Na_2 = NaI + Na + + 53.3 ± 0.8	537-623	13.41	-	-	-	rare. fl.	[1249, 165]	704
I + Cl_2 = ICl + Cl - - 7.3	300	3.56	-	-	-	from k_ and K	[358, 479]	
I + HI = I_2 + H - 34.8	633-738	-	12.74±0.2	1/2	35.9±0.5	therm.	[1446]	
	667-800	-	-	"	35.8	"	[1449]	705
I + N_2O = IO + N_2 + + 5.3 ± 5	876-973	-	14.45	0	38	therm.	[897]	
I + INO = I_2 + NO	333	12.6	-	-	-	pulse photol.	[1254]	
I + CH_4 = HI + CH_3 - - 31.2 ± 2	533-589	-	14.70	-	34.1	therm.	[562, 634]	706
	533-618	-	14.5	0	33.7	-	[948]	707
	548-618	-	14.95	0	35.0±1.1	therm.	[656]	
	-	-	14.49	-	-	est.	[154]	
	533-618	-	14.81±0.59	0	34.45± ±1.54	-	-	708
I + C_2H_5 = HI + C_2H_4	301 and 364	-	-	-	-	photol.	[696]	709

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$I + C_2H_6 = HI + C_2H_5$ - - 26.6 ± 1.1	503-618	-	14.12±0.56	0	26.4±1.5	therm.	[948]	
	"	-	14.6	0	27.6	-	"	707
	536-576	-	14.22	0	27.9	therm.	[734]	
	-	-	14.4±0.3	-	-	-	[948]	710
$I + C_3H_8 = HI +$ $+ CH_2CH_2CH_3$	503-618	-	14.88±0.54	0	29.59±±1.40	therm.	[948]	
	"	-	14.6	0	28.9	"	"	707
	-	-	14.2	-	-	est.	[154]	
$I + C_3H_8 = HI +$ $+ CH_3CHCH_3$	503-618	-	14.04±0.72	0	23.80±±1.90	therm.	[948]	
	"	-	14.3	0	24.4	"	"	707
	581-613	-	14.2	0	25	"	[153]	
$I + C_3H_8 = HI + C_3H_7$	503-618	-	14.27±0.72	0	24.43±±1.90	therm.	[948]	
	581-613	-	14.53±0.36	0	25.5±1.0	"	[153]	
$I +$ iso-$C_4H_{10} = HI +$ $+ (CH_3)_3C$	503-618	-	14.30±0.42	0	22.55±±1.10	therm.	[948]	
	"	-	14.0	0	21.85	"	"	707
	525-583	-	13.83±0.15	0	21.4±0.5	"	[156]	
$I + C_3H_6 = HI + C_3H_5$	481-573	-	13.3±0.1	0	18.0±0.3	therm.	[633]	
$I + C_4H_8\text{-}1 = C_4H_8\text{-}2 + I$	465-572	-	12.0±0.3	0	12.4±0.6	therm.	[503]	
$I + C_6H_5CH_3 = HI +$ $+ C_6H_5CH_2$	480-666	-	11.43±1.22	0	14.4±2.9	therm.	[1566]	
$I + (CH_3)_2CHOH = HI +$ $+ (CH_3)_2COH$	480-572	-	11.07±0.9	0	20.47±±0.22	therm.	[1564]	
$I + HCHO = HI + HCO$	453-573	-	13.92±0.4	0	17.43±0.9	therm.	[1565]	
$I + CH_3CHO = HI +$ $+ CH_3CO$	495-541	-	13.3	0	15.7	therm.	[1203]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$I + CF_3H = HI + CF_3$	346-562	-	13.08	-	-	from k_ and K	[24]	
	589-672	-	13.6	0	36.3±3	therm. , stat.	[655]	
$I + CH_3I = I_2 + CH_3$	522-758	-	13.71	0	19.2	therm.	[218]	
	533-589	-	14.4±0.2	0	20.5±0.5	"	[562]	711
	543-593	-	14.3	0	19.8±0.5	"	[1448, 1192]	
	553	6.20	-	-	-	"	1192, 154	
	522-758	-	13.65±0.37	0	18.80±±1.06	"	-	712
$I + CF_3I = I_2 + CF_3$	358-508	-	13.87	0	17.8	from k_ and K	[24]	
	413-453	-	12.6	0	16.0	therm., photochem.	[985]	
	440-758	-	13.8	0	17.6	therm.	[486]	
	360-760	-	13.91±0.45	0	18.14±±0.98	"	-	713
$I + C_2H_5I = I_2 + C_2H_5$	523-573	-	13.62	0	16.7±0.5	therm.	[1448, 1192]	
	583	6.83	-	-	-	"	[1192, 154]	
	536-576	-	14.01±0.28	0	17.1±0.7	"	[734]	
	528-576	-	14.54±1.51	-	18.72±±3.78	"	-	714
$I + C_2H_4I_2 = I_2 + C_2H_4I$	478-503	-	-	0	11.9±3	therm.	[35]	
	"	-	12.45	0	9.22	"	-	715
$I + C_2F_5I = I_2 + C_2F_5$	393-443	-	-	-	-	therm.	[695]	716
$I + n\text{-}C_3H_7I = I_2 + n\text{-}C_3H_7$	533-573	-	13.9	0	18	therm.	[1448, 1192]	240, 717, R
	584-627	-	13.477	0	20	"	[864, 1382]	718
	-	-	14.21	-	-	-	[154]	719
$I + iso\text{-}C_3H_7I = ?$	565-609	-	13.20	0	42.9	therm.	[864]	720
$I + (+)C_4H_9I = (-)C_4H_9I + I$	511-549	-	11.7	1/2	13.78	therm.	[1198]	721

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$I + sec\text{-}C_4H_9I = I_2 +$	511–549	–	11.63	1/2	16.82–	therm.	[1193]	
$+ sec\text{-}C_4H_9$	"	–	14.34	0	16.2	"	[1193, 142, 1175]	722
$I + tert\text{-}C_4H_9I = I_2 +$ $+ tert\text{-}C_4H_9$	525–583	–	13.7	0	13.0±0.7	therm.	[156]	723
$I + sec\text{-}C_4H_9I = I +$	511–549	–	12.96	0	17.5	therm.	[1193, 1175	724
$+ C_4H_8 + HI$	565–606	–	12.47	0	17.9	"	1175]	
$I + iso\text{-}C_4H_9I = HI +$ $+ iso\text{-}C_4H_8 + I$	473–517	–	13.56	0	17.9	therm.	[142]	
$I + C_3H_5I = I_2 + C_3H_5$	481–573	–	13.3±0.1	0	6.8	therm.	[633]	
$I + C_6H_5I = I_2 + C_6H_5$	648–773	–	14.36±0.06	0	28.4±0.2	therm.	[1331]	
$I + C_6H_5CH_2I = I_2 +$ $+ C_6H_5CH_2$	480–666	–	11.75±0.5	0	3.5±1	est.	[1566]	
$I + CCl_3CHO = HI +$ $+ CCl_3 + CO$	626–685	–	–	0	21	therm.	[1549]	
$I + CH_3COI = I_2 +$ $+ CH_3CO$	495–541	–	13.9	0	14.6	therm.	[1203]	
$I + I \rightarrow I_2$	373	10.67±0.18	–	–	–	therm., photochem.	[985]	725
$I + I + He = I_2 + He$	293	15.53	–	–	–	pulse photol.	[1346]	726
	"	15.80	–	–	–	"	[356]	"
	"	15.08_4	–	–	–	"	[355]	727
	"	15.19	–	–	–	"	[1253]	728
	room	15.51±0.03	–	–	–	photol.	[1299]	726
	295 and 427	–	14.88	0	–0.4	pulse photol.	[1253]	
	323–548	–	14.68	0	–0.66	"	[510]	
	"	–	17.13±0.10	–0.80 ±0.04	0	"	"	
	400	15.28	–	–	–	"	[1346]	726
	1000–1600	–	13.02	0	–7.96±1	shock	[237]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	1000-1600	-	23.27±2.40	-2.85 ±0.80	0	shock	[237]	
	1400	14.25	-	-	-	"	"	
	290-1600	-	18.35±0.56	-1.27 ±0.20	0	-	-	729
$I + I + Ne = I_2 + Ne$	293	15.22_2	-	-	-	pulse photol.	[355]	
	"	15.83	-	-	-	"	[356]	726
	"	15.55_6	-	-	-	"	[1346]	"
	333	15.28	-	-	-	"	[1254]	
$I + I + Ar = I_2 + Ar$	298	15.52	-	-	-	pulse photol.	[355]	
	"	15.86	-	-	-	"	[1346]	726
	"	15.94	-	-	-	"	[356]	"
	"	15.46±0.02	-	-	-	"	[1448]	
	"	15.56	-	-	-	"	[1346]	726, 730
	"	15.77±0.02	-	-	-	"	[1258]	728
	room	15.81±0.04	-	-	-	photol.	[1299]	726
	"	15.34	-	-	-	pulse photol.	[237]	731
	"	15.62±0.04	-	-	-	"	[1054]	726
	"	≤ 15.8	-	-	-	photol.	[356]	
	295 and 427	-	-	0	-1.8±0.1	pulse photol.	[1258]	728
	298	15.65	-	-	-	"	[489]	726
	"	15.56±0.02	-	-	-	"	[1442]	728
	298-418	-	14.54	0	-1.4	"	"	
	302-548	-	14.67	0	-1.18	pulse photol., shock	[259, 260]	
	"	-	18.76_5	-1.83	0	"	"	
	328	15.50	-	-	-	pulse photol.	[510]	726
	400	15.14	-	-	-	"	[1346]	"
	428	15.26	-	-	-	"	[510]	"
	1060-1860	-	20.57±0.42	-1.9	0	shock	[284]	"
	"	-	-	0	-1.8	"	"	"
	1080-1570	-	13.88	0	-4.56± ±0.82	"	[237]	
	"	-	20.17±0.36	-1.77 ±0.12	0	"	"	
	1300	14.65	-	-	-	"	"	
	290-1570	-	18.67±0.25	-1.30 ±0.09	0	-	-	732
$I + I + Kr = I_2 + Kr$	293	16.09	-	-	-	pulse photol.	[356]	726
	"	15.61	-	-	-	"	[355]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$I + I + Xe = I_2 + Xe$	293	16.09_4	-	-	-	pulse photol.	[356]	726
	"	15.73_4	-	-	-	"	[355]	
$I + I + H_2 = I_2 + H_2$	293	15.98	-	-	-	pulse photol.	[1346]	726
	room	15.86±0.08	-	-	-	photol.	[1299]	"
	323 and 548	-	14.82	0	-1.22± ±0.01	pulse photol.	[510]	733, 728
	"	-	19.35±0.17	-1.48 ±0.07	0	"	"	
	326	-	-	-	-	"	[259]	
$I + I + D_2 = I_2 + D_2$	326	-	-	-	-	pulse photol.	[259]	734
$I + I + N_2 = I_2 + N_2$	293	15.95_4	-	-	-	pulse photol.	[1346]	726
	room	16.07±0.07	-	-	-	photol.	[1299]	"
	400	15.56_6	-	-	-	pulse photol.	[1346]	
	1000-1600	-	14.136	0	-4.24± ±0.79	shock	[237]	735
	"	-	19.15±0.81	-1.88 ±0.27	0	"	"	"
	"	-	13.83	0	-4.83± ±0.65	"	"	736, 737
	1000-1600	-	19.78±0.72	-1.65 ±0.24	0	shock	[237]	736, 737
	1060-1860	-	20.58±0.87	-1.91 ±0.29	0	"	[234]	736
	"	-	19.33±0.96	-1.44 ±0.32	0	"	"	735
	1300	14.64	-	-	-	"	[237]	736
	"	14.85	-	-	-	"	"	735
	400-1860	-	20.31±0.09	-1.82 ±0.03	0	-	-	738
$I + I + O_2 = I_2 + O_2$	293	16.11_4	-	-	-	pulse photol.	[1346]	726
	"	15.83	-	-	-	"	[1253]	
	room	16.28±0.02	-	-	-	photol.	[1299]	726
	295 and 427	-	14.70	0	-1.5	pulse photol.	[1253]	728
	1275	14.72	-	-	-	shock	[237]	
$I + I + I_2 = I_2 + I_2$	293	17.93	-	-	-	pulse photol.	[355]	
	"	18.11	-	-	-	"	[237]	
	room	18.26	-	-	-	photol.	[356]	
	300	~18.25	-	-	-	pulse photol.	[259, 260]	726

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	302-548	-	10.65	3/2	-5,82	pulse photol.	[259, 260]	7[redacted], R
$I + I + HI = I_2 + HI$	323	16.45±0.03	-	-	-	pulse photol.	[510]	731
$I + I + CO = I_2 + CO$	323	15.74±0.02	-	-	-	pulse photol.	[510]	
$I + I + CO_2 = I_2 + CO_2$	room	16.50±0.08	-	-	-	photol.	[1299]	
	295 and 427	-	14.83	0	-1,75	pulse photol.	[1258]	
	400	16.04	-	-	-	"	[1346]	
	1000-1600	-	14.11	0	-9,46	shock	[237]	
	"	-	28.42	-4.74	0	"	"	
	300-1600	-	26.22_5±0,77	-4.04 ±0.26	0	-	-	739
$I + I + NO = I_2 + NO$	323	> 20.68	-	-	-	pulse photol.	[510]	
	333	19,48	-	-	-	"	[1254]	
$I + I + H_2O = I_2 + H_2O$	293	16.99_6	-	-	-	pulse photol.	[1346]	726
$I + I + CH_4 = I_2 + CH_4$	293	16.25_4	-	-	-	pulse photol.	[1346]	726
	room	16.34±0.07	-	-	-	photol.	[1299]	"
$I + I + C_3H_8 = I_2 +$ $+ C_3H_8$	293	16.78_5	-	-	-	pulse photol.	[1346]	726
$I + I + n\text{-}C_4H_{10} =$ $= I_2 + n\text{-}C_4H_{10}$	305-493	-	21.89	-2.16	0	pulse photol.	[259, 260]	
	"	-	15.36	0	-1.65	"	"	728
$I + I + n\text{-}C_5H_{12} = I_2 +$ $+ n\text{-}C_5H_{12}$	293	16.97_2	-	-	-	pulse photol.	[1346]	726
	298	16.81	-	-	-	"	[1054]	"
$I + I + (CH_3)_4C = I_2 +$ $+ (CH_3)_4C$	293 and 473	16.94	-	-	-	pulse photol.	[1346]	726
	room	16.76±0.03	-	-	-	"	[1054]	"
$I + I + C_2H_4 = I_2 +$ $+ C_2H_4$	293	16.53	-	-	-	pulse photol.	[1346]	726
$I + I +$ cyclo-$C_3H_6 =$ $= I_2 +$ cyclo-C_3H_6	293	16.89_7	-	-	-	pulse photol.	[1346]	726

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
I + I + cyclo-C_6H_{12} =	293	17.03_3	-	-	-	pulse photol.	[1346]	726
= I_2 + cyclo-C_6H_{12}	400	16.67_2	-	-	-	"	"	
I + I + C_6H_6 = I_2 +	293	17.24_2	-	-	-	pulse photol.	[1346]	726, 728
+ C_6H_6	room	~17.26	-	-	-	photol.	[1299]	726
	295 and 427	-	15.63	0	-1.7	pulse photol.	[1253]	
	323-546	-	23,26	-2,58 ±0,07	0	"	[510]	
	"	-	15,59	0	-1,97	"	"	
	400	$16,74_8$	-	-	-	"	[1346]	726
I + I + $C_6H_5CH_3$ = I_2 +	293	$17,62_3$	-	-	-	pulse photol.	[1346]	726
+ $C_6H_5CH_3$	"	17,59	-	-	-	"	"	728
	295 and 427	-	15.27	0	-2.7	"	[1253]	
I + I + $C_6H_3(CH_3)_3$ =	295 and 427	-	17.60_7	0	-4.1	pulse photol.	[1253]	728
= I_2 + $C_6H_3(CH_3)_3$								
I + I + para- xylene =	298	17,82	-	-	-	pulse photol.	[1346]	726
= I_2 + $CH_3C_6H_4CH_3$								
I + I + mesitylene =	298	17.90_8	-	-	-	pulse photol.	[1346]	726
= I_2 + C_9H_{12}	295 and 427	-	14.54	0	-4,1	"	[1253]	
I + I + CH_3OH = I_2 +	298	$17,11_4$	-	-	-	pulse photol.	[1346]	726
+ CH_3OH								
I + I + $(CH_3)_2O$ = I_2 +	298	17.09_8	-	-	-	pulse photol.	[1346]	726
+ $(CH_3)_2O$								
I + I + CH_2Cl_2 = I_2 +	298	16.97_7	-	-	-	pulse photol.	[1346]	726
+ CH_2Cl_2								
I + I + CCl_4 = I_2 +	298	17.00_8	-	-	-	pulse photol.	[1346]	726
+ CCl_4								
I + I + CH_3I = I_2 +	323-548	-	15.86	0	-2.55	pulse photol.	[510]	
+ CH_3I	"	-	25,19	-8.24		"	"	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$I + I + C_2H_5Cl = I_2 + C_2H_5Cl$	293	16.97_7	-	-	-	pulse photol.	[1346]	726
$I + I + C_2H_5Br = I_2 + C_2H_5Br$	293	17.20_4	-	-	-	pulse photol.	[1346]	726
$I + I + C_2H_5I = I_2 + C_2H_5I$	293	17.69_8	-	-	-	pulse photol.	[1346]	726, 728
	295 and 427	-	15.62_5	0	-2.4	"	[1258]	
	823	17.87±0.04	-	-	-	"	[510]	
$I + I + C_2F_4 = I_2 + C_2F_4$	293	16.62_3	-	-	-	pulse photol.	[1346]	726
$I + I + C_6H_3F_3 = I_2 + C_6H_3F_3$	293	17.24_2	-	-	-	pulse photol.	[1346]	726
$I +$ cyclo-$C_3H_6 \rightarrow C_3H_6I$	453-503	-	13.16	0	18.8±2.0	photochem.	[1194]	
	518-552	-	12.865	0	17.28	therm.	"	740
$I + C_2H_5O \rightarrow C_2H_5OI$	298 ± 2	-	-	-	-	photochem.	[744]	741

RADICAL REACTIONS

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$BH_3 + B_2H_6 = B_3H_7 + H_2$	358-436	-	11.05_6	0	11.5	pyr. B_2H_6	[366,123,1345]	742
$BH_3 + B_2D_6 = BH_3BD_3 + BD_3$	297-317	-	13.44_7	0	7.8	therm.	[1070, 123, 1345]	
	"	-	14.2	0	6.0	"	[1070, 1524]	
$BH_3 + BH_3CO = B_2H_6 + CO$	273-303	-	11.4	0	7.0	therm.	[263, 1524]	
$BH_2D + B_2H_6 = B_2H_5D + BH_3$	308-348	-	-	-	-	therm.	[1069,1070]	
$BD_3 + B_2H_6 = BD_3BH_3 + BH_3$	297-317	-	14.2	0	6.0	therm.	[1070,1524]	
$BD_3 + BD_3CO = B_2D_6 + CO$	283-299	-	-	-	-	therm.	[263]	
$B_5H_{11} \rightarrow B_5H_9 + H_2$	373-393	-	13.8	0	18.7	pyr. B_2H_6	[219]	
	383	3.1	-	-	-	"	"	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH + H_2 \rightarrow CH_3$	room	11.79	-	-	-	pulse photol. CH_4	[221]	
$CH + N_2 \rightarrow$ products	room	~10.63	-	-	-	pulse photol. CH_4	[221]	
$CH + O_2 = CO + OH'(^2\Sigma)$	800-2000	10.78	-	-	-	fl.	[1256]	
$CH + CH \rightarrow C_2H_2$	room	~14.08	-	-	-	pulse photol. CH_4	[221]	
$CH + CH_4 = C_2H_4 + H$	room	12.18	-	-	-	pulse photol. CH_4	[221]	
$CH + NH_3 = HCN + H_2 + H$	?	10.78	-	-	-	fl.	[1348]	
$CH_2 + H_2 = CH_4^* = CH_3 + H$ or CH_4	300 and 341	-	-	-	-	photol. CH_2N_2	[133]	
$CH_2 + D_2 = CH_2D_2^* = CH_2D + D$ or CH_2D_2	276-349	-	-	-	-	photol. CH_2CO and CH_2N_2	[133]	
$CH_2 + CD_4 = C_2H_2D_4^* = CH_2D + CD_3$ or $C_2H_2D_4$	300	-	-	-	-	photol. CH_2N_2	[133]	
$CH_2 + C_3H_8 = CH_3 + C_3H_7$	room?	-	-	-	-	photol. CH_2N_2	[1321]	743
$CH_2 + n\text{-}C_4H_{10} = CH_3 + C_4H_9$	room?	-	-	-	-	photol. CH_2N_2	[1321]	743
$CH_2 + iso\text{-}C_4H_{10} = CH_3 + C_4H_9$	room?	-	-	-	-	photol. CH_2N_2	[1321]	743

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_2 + (CD_3)_3CH = CH_3 + (CD_3)_3C$	593	-	-	-	-	photol. CH_2CO	[705]	744
$CH_2 + CH_2F_2 = C_2H_3F + HF$	354–528	-	-	-	-	photol. CH_2CO	[1263]	
$CH_2 + CH_3Cl = CH_2Cl + CH_3$	room	-	-	-	-	photol. CH_2CO CH_2N_2	[1388]	
$CH_2 + CH_3CH_2Cl = CH_2Cl + C_2H_5$	room	-	-	-	-	photol. CH_2CO	[100]	767
$CH_2 + C_3H_8 \rightarrow C_4H_{10}$	room?	-	-	-	-	photol.	[1321]	
$CH_2 + C_3H_8 \rightarrow$ iso-C_4H_{10}	-	-	-	-	-	photochem.	[951]	745
$CH_2 +$ n-$C_4H_{10} \rightarrow$ iso-C_5H_{12}	-	-	-	-	-	photochem.	[951]	746, 747
$CH_2 +$ iso-$C_4H_{10} \rightarrow (CH_3)_4C$	-	-	-	-	-	photochem.	[951]	748, 747
$CH_2 +$ n-$C_5H_{12} \rightarrow$ 2-methylpentane	-	-	-	-	-	photochem.	[951]	749
$CH_2 +$ n-$C_5H_{12} \rightarrow$ 3-methylpentane	-	-	-	-	-	photochem.	[951]	750
$CH_2 + C_2H_4 \rightarrow$ cyclo-C_3H_6	room	-	-	-	-	photol. CH_2CO	[326]	751
$CH_2 + C_2H_4 \rightarrow C_3H_6$	297	-	-	-	-	Hg photo.	[967]	752, 753
$CH_2 + CH_2 = C = CH_2 \rightarrow C_4H_6$	338	-	-	-	-	photol. CH_2N_2	[591]	754
$CH_2 + CH_2CHCHCH_2 \rightarrow C_5H_8$	297	-	-	-	-	Hg photo.	[967]	755, 756

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_2 + C_3H_6 \rightarrow C_4H_8$	297	-	-	-	-	Hg photo.	[967]	757, 758
$CH_2 + C_2H_5CHCH_2 \rightarrow$ $\rightarrow C_5H_{10}$	297	-	-	-	-	Hg photo.	[967]	759
$CH_2 + (CH_3)_2CCH_2 \rightarrow$ $\rightarrow C_5H_{10}$	297	-	-	-	-	Hg photo.	[967]	760
$CH_2 +$ cis-$CH_3CHCHCH_3 \rightarrow$ $\rightarrow C_5H_{10}$	297	-	-	-	-	Hg photo.	[967]	761
	298	-	-	-	-	photol. CH_2CO	[1407]	
$CH_2 +$ trans-$CH_3CHCHCH_3$ $\rightarrow C_5H_{10}$	297	-	-	-	-	Hg photo.	[967]	762, 763
$CH_2 +$ cis-$CD_3CDCDCD_3 \rightarrow$ $\rightarrow C_5H_2D_8$	298	-	-	-	-	photol. CH_2CO	[1407]	
$CH_2 + (CH_3)_2CCHCH_3 \rightarrow$ $\rightarrow C_6H_{12}$	297	-	-	-	-	Hg photo.	[967]	764
$CH_2 + (CH_3)_2CC(CH_3)_2 \rightarrow$ $\rightarrow C_7H_{14}$	297	-	-	-	-	Hg photo.	[967]	765
$CH_2 + CH_2F_2 \rightarrow C_2H_4F_2$	354-528	-	-	-	-	photol. CH_2CO	[1268]	766

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + H_2 = CH_4 + H - 1.7\pm2$	323 - 523	-	13.24	0	13 ± 2	photol.	[29,1524]	768
	375 - 523	-	-	0	9.1	therm., photochem.	[1235]	771,772
	"	-	11.32	0	9.3±0.5	photol. $(CH_3)_2$	[1235,1523]	768
	"	-	11.7	0	9.9±0.5	"	[1597,1235, 1524]	773, R
	409 - 571	-	11.1	0	9.2	photol.	[1039,1041, 1040,1597]	768,772
	"	-	11.02	0	9.2±0.3	photol. $(CH_3)_2CO$	[1041,1523]	768
	409 - 591	-	12.32	0	13.2±0.4	"	[446,1523]	"
	"	-	14.62	0	15.3±1.0	photol. CH_3CHO	"	"
	"	-	12.5	0	13.2±1.0	photol.	[446,1524]	774,772
	423 - 523	-	-	0	13±2	"	[29]	771,774
	433 - 573	-	-	0	11±2	"	[1473]	
	"	-	-	0	9±2	"	[414]	
	580 - 705	-	-	0	8	diff. fl.	[733]	775
	825	~9.12	-	-	-	photol.	[653]	768
	970 - 1300	-	12.5	0	10.2	-	[1409]	95
$CH_3 + HD = CH_4 + D$	413 - 569	-	11.04	0	10.0	photol. CH_3COCH_3	[1597]	768,769
$CH_3 + HD = CH_3D + H$	408 - 569	-	11.29	0	11.3	photol. CH_3COCH_3	[1597]	768,769
$CH_3 + D_2 = CH_3D + D$	298 - 398	-	-	0	12.0±0.7	β radiol.	[986]	
	300 - 526	-	12.26	0	12.7±0.5	photol. $Hg(CH_3)_2$	[1310]	768
	366 - 539	-	-	0	8.1	"	[1415]	
	408 - 564	-	11.78	0	11.8	photol. CH_3COCH_3	[1597]	768,769
	408 - 568	-	11.67	0	11.7±0.1	"	[1040,1041, 1039]	768,770
	414 - 701	-	-	-	-	"	[1092]	776
	440	-	-	0	11.1	dis.	[1518]	777
	484	-	-	-	-	pyr. of xylene	[272]	778
	409 - 591	-	12.5	0	14.3±0.6	photol. CH_3COCH_3	[446,1524]	779
	300 - 570	-	11.99±0.12	0	12.30±0.24	-	-	780
$CH_3 + O_2 = CH_3O + O$	1000 - 2500	-	-	0	34.4	shock	[1420,1764]	781
$CH_3 + O_2 = HCHO + OH$	293	-	-	-	-	photol. CH_3I	[350]	782,783
	473 and 523	-	15.15	0	18.0	photol. CH_3COCH_3	[789,787,788]	
	438 - 623	-	-	0	1.5±0.5	photol. $(CH_3)_2CO$	[1543]	
$CH_3 + O_2 = HCO + H_2O$	393 - 473	-	10.92	0	0.27±0.50	-	[1050]	784

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + Cl_2 = CH_3Cl + Cl$	-	-	12.9	0	2,3	photo-Cl_2	[499]	
$CH_3 + Br_2 = CH_3Br + Br$	310 - 483	-	12.74	0	0,44	photochem.	[937]	785
	413	-	-	0	0,9	est.	[122]	
	483	12.5	-	-	-	therm., photochem.	[937,1524]	786
$CH_3 + I_2 = CH_3I + I$	273	-	-	-	-	photol. CH_3I	[179,119]	787
	313 - 373	-	-	0	~1	pyr. CH_3I	[1379]	
	333	-	-	0	0,5±0.5	photochem.	[26]	
	355 - 428	-	-	-	-	photol. CH_3I	[1617]	788
	533 - 589	-	12.9	0	0,4	therm.	[562]	
	543 - 593	-	12.88	-	1,2	therm. from k_- and K	[1448,1192]	
	530 - 590	-	12.9	0	0,8±0,4	therm.	-	789
$CH_3 + HCl = CH_4 + Cl -$ $- 0.6 \pm 2.0$	193 - 593	-	-	0	4,4	-	[22]	790,791
	273 - 488	-	12,3	0	4,8	from k_- and K, therm., stat.	[1275]	
	300 - 485	-	12,4	0	4,9	from k_- and K photol. Cl_2	[1276]	792
	301 and 423	-	11.4	0	2,3	photol. CH_3COCH_3	[425]	768,793, 794
	370 - 433	-	-	-	-	photol. CH_3I	[1617]	795
	-	-	12.0	0	5,0	photo-Cl_2	[346,499]	
	300 - 500	-	12.23	0	4,9	-	-	796
$CH_3 + HBr = CH_4 + Br$	310 - 483	-	-	-	-	photochem.	[937]	785,797
	333	-	-	0	1,5±1,0	-	[26]	798
	353 - 561	-	-	0	1.4	photol. CH_3COCH_3	[551]	799
	"	-	12.6	0	2,17	photol.	"	800
	355 - 465	-	-	0	0.95	photol. CH_3I	[1617]	801
	"	-	12.8	0	1,75	"	"	800
	413	-	11,95	0	2,9	est.	[122]	
	350 - 560	-	12,7	0	1,96	-	-	802
$CH_3 + HI = CH_4 + I$	533 - 589	-	12,4	0	1,2	therm.	[562]	
	543 - 593	-	11.98	0	1.2	from k_r and K	[1448,1192]	803
	553	11.77	-	-	-	-	-	804
	530 - 590	-	12,2	0	1,2	-	-	789
$CH_3 + H_2O = CH_4 + OH -$ $- 16.4 \pm 2$	1000 - 2000	-	13,10	0	22,56	-	-	805

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + H_2S = CH_4 + SH +$ $+ 10.9$	323 - 413	-	12.04±0.27	0	3.49±0.56	photol. $(CH_3)_2CO$	[441]	809
	323 - 473	-	11.35	0	2.6	"	[816]	768
	473 - 633	-	-	0	2.8	photol. CH_3CHO	[816a]	806,807, 808
$CH_3 + NH_3 = CH_4 + NH_2 -$ $- 2.4±4$	398 - 448	-	10.84±0.50	0	9.8±0.9	photol. CH_3NNCH_3	[673]	768
	453 - 612	-	10.75	0	10.0±0.4	photol. CD_3COCD_3	[1529]	768,794
	400 - 600	-	10.8	0	9.9	-	-	810
$CH_3 + ND_3 = CH_3D + ND_2$	383 - 453	-	11.00±0.42	0	10.9±0.9	photol. CH_3NNCH_3	[673]	768
$CH_3 + N_2H_4 = CH_4 + N_2H_3$	355 - 453	-	11.00±0.05	0	5.0±0.1	photol. CH_3NNCH_3	[673]	768
$CH_3 + N_2D_4 = CH_3D +$ $+ N_2D_3$	383 - 453	-	10.86±0.17	0	6.39±0.32	photol. CH_3NNCH_3	[662]	768
$CH_3 + NO_2 = CH_3O + NO$	323 - 363	-	-	0	~0	therm.	[1245]	
	363	12.52	-	-	-	therm.	"	811
	443	12.38	-	-	-	pyr., flow	[1770]	768
	1420 - 1860	-	12.75	0	5.7	shock	[776]	812
$CH_3 + SF_6 = CH_3F + SF_5$	413 - 443	-	13.3	0	14.1	pyr. $(tert\text{-}C_4H_9O)_2$	[121]	768
$CH_3 + CH_4 = CH_4 + CH_3$	473 - 623	-	11.83	0	14.65±0.3	photol.	[429]	768
	"	-	12.00	0	14.9	"	[409]	R
	473 - 573	-	11.95	0	14.94± 1	"	[428]	813
	523	5.76	-	-	-	"	[409]	
$CH_3 + CD_4 = CH_3D + CD_3$	426 - 701	-	11.15	0	13.0	photol. $(CH_3)_2CO$	[432,428]	768,814
$CH_3 + C_2H_5 = CH_4 + C_2H_4$	room	-	-	-	-	photol.	[1483]	815
	353 - 461	-	-	-	-	"	[920]	816
	353 - 510	-	12.74	0	0	photol. CH_3COCH_3	[1495]	817
$CH_3 + C_2H_6 = CH_4 + C_2H_5$	303 - 562	-	-	0	8.3	photol. $Hg(CH_3)_2$	[1415]	
	903	8.15	-	-		shock	[177]	105
$CH_3 + C_2D_6 = CH_3D +$ $+ C_2D_5$	527 - 780	-	-	0	14.8±0.3	photol. and pyr. CH_3COCH_3	[1088]	818
	"	-	11.3	0	14.8	"	[1088,671]	
	"	-	12.29	0	15.1	"	[1088,1737]	R

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + n\text{-}C_3H_7 = CH_4 + C_3H_6$	room	-	-	-	-	photol.	[1483]	819
	347 - 455	-	12.98	0	0	photol. $(CH_3)_2CO$	[1496]	820
$CH_3 + iso\text{-}C_3H_7 = CH_4 + C_3H_6$	room	-	-	-	-	photol.	[1483]	821
	347 - 455	-	13.29	0	0	photol. $(CH_3)_2CO$	[1496]	820
	363 - 423	-	13.32	0	0	"	[920]	822
$CH_3 + C_3H_8 = CH_4 + n\text{-}C_3H_7$	714 - 776	-	12.64	0	17.5	pyr. C_3H_8, stat.	[987a]	
$CH_3 + n\text{-}C_4H_9 = CH_4 + C_4H_8$	348 - 457	-	13.17	0	0	photol. $(CH_3)_2CO$	[1497]	820
$CH_3 + sec\text{-}C_4H_9 = CH_4 + C_4H_8$	170 - 298	-	-	-	-	dis. , flow	[1293]	823
	381 - 412	-	-	-	-	pyr. $(tert\text{-}C_4H_9O)_2$	[1127]	824
$CH_3 + tert\text{-}C_4H_9 = CH_4 + C_4H_8$	293 - 333	-	-	-	-	photol. $(tert\text{-}C_4H_9O)_2$	[588]	825
	353 - 461	-	-	-	-	photol.	[920]	826
$CH_3 + n\text{-}C_4H_{10} = CH_4 + C_4H_9$	352 - 435	-	11.17	0	9.0 ± 1.0	photol. CH_3NNCH_3	[866]	768
	"	-	11.4	0	9.1 ± 0.3	"	[866,1524]	
	365 - 496	-	10.94	0	8.6 ± 0.3	photol. $Hg(CH_3)_2$	[1307]	768
	369 - 561	-	-	0	5.5	"	[1415]	
	373 - 573	-	10.03	0	8.3	photol. $(CH_3)_2CO$	[1526,1530]	768
	395 - 471	-	10.86	0	8.3 ± 0.2	photol. $(CD_3)_2CO$	[1526,1530, 1525]	768,827
	403 - 493	-	-	0	8.4	photol. $Hg(CH_3)_2$	[640]	828
	"	-	11.5	0	9.5 ± 0.5	"	[640,1524]	
	"	-	-	-	-	"	[640,483]	829
	350 - 500	-	11.21 ± 0.16	0	9.02 ± 0.3	-	-	830
$CH_3 + iso\text{-}C_4H_{10} = CH_4 + C_4H_9$	298 - 438	-	10.03	0	6.7 ± 0.8	photol. CH_3NNCH_3	[866]	771
	349 - 467	-	10.83	0	7.6 ± 0.2	photol. $(CD_3)_2CO$	[1526,1530, 1525]	768,794
	363 - 533	-	11.0	0	7.6	pyr.	[158]	768
	366 - 506	-	10.59	0	7.4 ± 0.3	photol. $Hg(CH_3)_2$	[1307]	768,794
	366 - 562	-	-	0	4.2	"	[1415]	771

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	384 - 419	-	10.91	0	7.7	pyr. (tert-$C_4H_9O)_2$	182	[768]
	300 - 500	-	10.66±0.32	0	7.73$_5$±0.57	-	-	[831]
	350 - 530	-	11.00±0.27	0	7.78±0.49	-	-	[832]
$CH_3 + n\text{-}C_5H_{12} = CH_4 + C_5H_{11}$	362 - 451	-	10.88	0	8.1±0.2	photol. $(CH_3)_2CO$	[1526,1530, 1525]	768
$CH_3 + (CH_3)_4C = CH_4 + CH_2(CH_3)_3C$	369 - 562	-	-	0	8.3	photol. $Hg(CH_3)_2$	[1415]	771
	404 - 524	-	11.07	0	10.4±0.3	"	[1307]	768,794
	432.5 - 481	-	11.16	0	10.0	photol. $(CD_3)_2CO$	[1525,1530, 1526]	" "
	405 - 525	-	11.25±0.61	0	10.55±1.26	-	-	833
$CH_3 + n\text{-}C_6H_{14} = CH_4 + C_6H_{13}$	365 - 457	-	10.97	0	8.1±0.2	photol. $(CH_3)_2CO$	[1526,1525]	768,834
CH_3 + 2,3-dimethylbutane = $CH_4 + C_6H_{13}$	300 - 463	-	10.70	0	6.9±0.2	photol. $(CH_3)_2CO$	[1526,1525]	768,794,835
	301 - 493	-	10.7	0	6.8±0.2	photol. $Hg(CH_3)_2$	[1307]	768
	300 - 500	-	10.7	0	6.85	-	-	836
CH_3 + 3-ethylpentane = $CH_4 + C_7H_{15}$	349 - 511	-	10.32	0	6.8±0.3	photol. $(CH_3)_2$	[1309]	768,794
CH_3 + 2,2,3,3-tetramethylbutane = $CH_4 + C_8H_{17}$	435 - 605	-	11.12	0	9.5±0.4	photol $(CD_3)_2CO$	[1525]	768,794
CH_3 + 2,3,4-trimethylpentane = $CH_4 + C_8H_{17}$	414 - 605	-	11.28	0	7.9±0.4	photol. $(CD_3)_2CO$	[1525]	837
	"	-	11.67	0	9.09	"	[1525,1524]	838, R
$CH_3 + C_2H_4 = CH_4 + C_2H_3$	461 - 613	-	11.12	0	10.0±0.4	photol. $(CD_3)_2CO$	[1528]	768,794
$CH_3 + C_3H_6 = CH_4 + C_3H_5$	353 - 453	-	10.3	0	7.2	photol. $(CH_3)_2CO$	[422,1530]	839,840
	381 - 441	-	11.04	0	8.2	pyr. (tert-$C_4H_9O)_2$	[1127]	768
	383 - 539	-	-	-	-	photol. $Hg(CH_3)_2$	[1474]	841
	436 - 577	-	10.63	0	7.7±0.4	photol. $(CD_3)_2CO$	[1528]	768,794
	350 - 580	-	10.5±0.3	0	7.5±0.6	-	-	842
$CH_3 + C_4H_8\text{-}1 = CH_4 + C_4H_7$	353 - 453	-	10.95	0	7.3	photol. $(CH_3CO)_2$	[422]	839,843
	462 - 613	-	11.04	0	7.6±0.4	photol. $(CH_3)_2CO$	[1528,1529]	768,794

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
CH_3 + 2-methylpropylene = $CH_4 + C_4H_7$	353 - 453	-	11.04	0	7.9	photol. $(CH_3CO)_2$	[422]	839,844
	441 - 577	-	10.76	0	7.3±0.4	photol. $(CD_3)_2CO$	[1528,1529]	768,794
CH_3 + cis-C_4H_8-2 = CH_4 + C_4H_7	353 - 453	-	11,11	0	7.6	photol. $(CH_3CO)_2$	[422]	839,845
	461 - 615	-	11.03	0	7.7±0.4	photol. $(CD_3)_2CO$	[1528,1529]	768,794
CH_3 + trans-C_4H_8-2 = $CH_4 + C_4H_7$	353 - 453	-	11.36	0	8.2	photol. $(CH_3CO)_2$	[422]	839,846
$CH_3 + C_5H_{10}$-1 = CH_4 + C_5H_9	461 - 619	-	11.06	0	7.6±0.4	photol. $(CD_3)_2CO$	[1528,1529]	768,794
CH_3 + 3-methyl-1-butene = $CH_4 + C_5H_9$	462 - 619	-	11.13	0	7.4±0.4	photol. $(CD_3)_2CO$	[1528,1529]	768,794
CH_3 + trimethylethylene = $CH_4 + C_5H_9$	403 and 453	-	~10.78	0	~6.7	photol. $(CH_3CO)_2$	[422]	839
CH_3 + tetramethylethylene = $CH_4 + C_6H_{11}$	403 and 453	-	~ 12.05	0	~ 8.9	photol. $(CH_3CO)_2$	[422]	839
	461 - 614	-	11.44	0	7.8±0.4	photol. $(CD_3)_2CO$	[1528,1529]	766,794
$CH_3 + C_2D_2 = CH_3D + C_2D$	473 - 773	-	-	0	18,3	photol. $(CH_3)_2CO$	[487]	847
CH_3 + 1-butyne = CH_4 + C_4H_5	456 - 620	-	11.75	0	9.1±0.4	photol. $(CD_3)_2CO$	[1529]	768,794
CH_3 + 2-butyne = CH_4 + C_4H_5	486 - 619	-	11.49	0	8.6±0.4	photol. $(CD_3)_2CO$	[1529]	768,794
CH_3 + cyclo-C_3H_6 = CH_4 + cyclo-C_3H_5	373 - 523	-	11.1	0	10.2±1.0	photol. $Hg(CH_3)_2$	[1237]	768
	412 - 565	-	10.83	0	10.3±0.4	photol. $(CD_3)_2CO$	[1529]	768,794
	370 - 565	-	10.71±0.65	0	9.72±1.33	-	-	848
CH_3 + cyclo-C_4H_8 = CH_4 + cyclo-C_4H_7	427 - 580	-	11.37	0	9.3±0.4	photol. $(CD_3)_2CO$	[1529]	768,794
CH_3 + cyclo-C_5H_{10} = CH_4 + cyclo-C_5H_9	339 - 569	-	11.22	0	8.3±0.2	photol. $(CH_3)_2CO$ and $(CD_3)_2CO$	[1529]	768,794
CH_4+ cyclo-C_6H_{12} = CH_4+ cyclo-C_6H_{11}	338 - 462	-	11.16	0	8.3±0.2	photol. $(CH_3)_2CO$	[1529]	768,794
	354 - 493	-	11.11	0	8.3±0.3	photol. $Hg(CH_3)_2$	[1307]	" "

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
CH_3 + cyclohexadienyl-1,4 = CH_4 + C_6H_6	296 - 390	-	-	-	-	photol.	[843]	933
CH_3 + cyclohexadiene-1,4 = CH_4 + C_6H_7	296 - 390	-	11.46±0.2	0	5.5±0.3	photol. $(CH_3N)_2$	[843]	768
$CH_3 + C_6H_6 = CH_4 + C_6H_5$	456 - 600	-	10.26	0	9.2±0.4	photol. $(CD_3)_2CO$	[1529,1269]	768,794
	482.5	6.65	-	-	-	pyr. (tert-$C_4H_9O)_2$	[1161]	
	744 - 800	-	10.76	0	9.3	photol. $(CH_3)_2CO$	[962]	768
	450 - 800	-	10.99±0.59	0	10.33± ±1.65	-	-	849
$CH_3 + C_6H_5CH_3 = CH_4 + C_6H_5CH_2$	373 - 526	-	10.47	0	7.4±0.3	photol. $(CH_3)_2CO$	[266]	768
	373 - 573	-	11.6	0	9.5	"	[339]	768
	376 - 522	-	-	0	5.6	photol. $Hg(CH_3)_2$	[1474]	841
	"	-	10.0	0	7±2	"	[1474,1524]	
	380 - 573	-	11.5	0	9.45	photol. $(CH_3)_2CO$	[910]	768
	393 - 607	-	10.96	0	8.3±0.3	photol. $(CD_3)_2CO$	[1529]	768,794
	403 - 983	-	-	0	12±2	pyr. (tert-$C_4H_9O)_2$	[1461a]	
	422 - 523	-	10.35	0	7.3±0.3	photol. $(CH_3)_2$	[1307]	768,794
	430 - 540	-	11.4	0	9.2±0.3	pyr. (tert-$C_4H_9O)_2$	[1161]	768
	513 - 644	-	13.15_5	0	12.30	pyr.	[786]	
	370 - 640	-	11.0±0.26	0	8.465± ±0.535	-	-	850
$CH_3 + C_6H_5CD_3 = CH_4 + C_6H_4CD_3$	333	4.35_5± ±0.07_5	-	-	-	photol. $(CH_3N)_2$	[338]	768
$CH_3 + C_6H_5CD_3 = CH_3D + C_6H_5CD_2$	333	4.41±0.04	-	-	-	photol. $(CH_3N)_2$	[338]	768
	373 - 573	-	11.65	0	11.25	photol. $(CH_3)_2CO$	[910]	"
	"	-	11.6	0	11.3	"	[339]	"
$CH_3 + C_6D_5CH_3 = CH_4 + C_6D_5CH_2$	333	5.57±0.09	-	-	-	photol. $(CH_3N)_2$	[338]	768
$CH_3 + C_6D_5CH_3 = CH_3D + C_6D_4CH_3$	333	3.99±0.09	-	-	-	photol. $(CH_3N)_2$	[338]	768
	455	4.70_7	-	-	-	photol. $(CH_3)_2CO$	[910]	"
$CH_3 + C_6D_5CD_3 = CH_3D + C_7D_7$	333	4.57±0.03	-	-	-	photol. $(CH_3N)_2$	[338]	768

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + C_6H_5C_2H_5 = CH_4 + C_6H_5C_2H_4$	358 - 456	-	10.82	0	7.0±0.3	photol. $(CH_3)_2CO$	[266]	768, 851
$CH_3 + C_6H_5$ iso-$C_3H_7 = CH_4 + C_6H_5C_3H_6$	396 - 522	-	10.76	0	6.44±0.5	photol. $(CH_3)_2CO$	[266]	768, 851
CH_3 + para-xylene = CH_4 + para-$CH_2C_6H_4CH_3$	372 - 470	-	10.82	0	7.4±0.2	photol. $(CH_3)_2CO$	[1350]	768, 851
CH_3 + ortho-xylene = CH_4 + ortho-$CH_2C_6H_4CH_3$	374 - 478	-	11.12_5	0	7.8±0.3	photol. $(CH_3)_2CO$	[1350]	768, 851
CH_3 + meta-xylene = CH_4 + meta-$CH_2C_6H_4CH_3$	373 - 470	-	11.44_5	0	8.5±0.3	photol. $(CH_3)_2CO$	[1350]	768, 851
CH_3 + diphenylmethane = $CH_4 + (C_6H_5)_2CH$	478 - 538	-	-	-	-	photol. $(CH_3)_2$	[1474]	841
$CH_3 + CH_3O = CH_4 + HCHO$	302 - 415	-	-	0	≤ 1.5	photol. $(CH_3)_2CO$	[1601]	852
	314 - 366	-	13.38	0	0	photol. $CH_3OCOOCH_3$	[1649]	853
	385 - 450	-	13.5	0	0	-	[158]	854
	393 - 455	-	13.38	0	0	pyr. $(CH_3)_2O_2$	[1502]	853, 855
$CH_3 + CD_3O = CH_3D + DCDO$	303 - 363	-	-	0	0	photol. CH_3COOCD_3	[1602]	856
	418 - 623	-	-	0	0	"	[1603]	"
$CH_3 + CH_3OH = CH_4 + CH_2OH$	373 - 523	-	10.6	0	8.2±0.5	photol. $Hg(CH_3)_2$	[1237]	768
	376 - 492	-	10.54	0	8.2±0.2	photol. $(CH_3)_2CO$	[1529]	768, 794
	378	-	-	-	-	p-s	[1174]	857
	406 - 472	-	11.38	0	10.4	photol. $(CH_3)_2CO$	[1391]	768, 858
	370 - 520	-	10.39±0.29	0	7.80±0.57	-	-	859
$CH_3 + CH_3OH = CH_4 + CH_3O$	427 - 477	-	9.25±0.3	0	6.4±0.7	photol. $(CH_3)_2CO$	[1391]	768, 858
$CH_3 + CH_3OH = CH_4 + [COH_3]$	406 - 472	-	10.76±0.07	0	8.7±0.2	photol. $(CH_3)_2CO$	[1391]	768
	413 - 523	-	11.26±0.07	0	9.82±0.15	"	[660b]	"
$CH_3 + CD_3OH = CH_3D + CD_2OH$	408 - 523	-	11.34±0.08	0	11.93±0.18	photol. $(CH_3)_2CO$	[660b, 756a]	768
	427 - 477	-	11.25±0.28	0	11.7±0.6	"	[1391]	"

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + CD_3OH = CH_4 + CD_3O$	408 - 523	-	~10.5	0	~9.5	photol. $(CH_3)_2CO$	[660b]	768
	427 - 477	-	9.25±0.3	0	6.4±0.7	"	[1891]	"
$CH_3 + C_2H_5OH = CH_4 + [C_2H_5O]$	403 - 523	-	11.71±0.06	0	9.65±0.14	photol.	[660a]	768
$CH_3 + C_2H_5OH = CH_4 + C_2H_4OH$	462 - 614	-	11.31_5	0	8.7±0.4	photol. $(CD_3)_2CO$	[1529]	768
$CH_3 + C_2H_5OH = CH_4 + CH_3CHOH$	378	-	-	-	-	radiol.	[1174]	860
	403 - 523	-	11.60±0.15	0	9.69±0.30	photol.	[660a]	768
$CH_3 + C_2H_5OH = CH_4 + C_2H_5O$	403 - 523	-	10.90±0.50	0	9.40±0.98	photol.	[660a]	768
	462 - 614	-	11.31	0	8.7±0.4	photol. $(CD_3)_2CO$	[1529]	768,794
$CH_3 + C_2H_5OH = CH_4 + CH_2CH_2OH$	378	-	-	-	-	radiol.	[1174]	861
	423	5.6±0.6	-	-	-	photol	[660a]	768,862
$CH_3 + C_2H_5OH = CH_4 + C_2H_5O$	403 - 523	-	10.90±0.50	0	9.40±0.98	photol.	[660a]	768
$CH_3 + CH_3CD_2OH = CH_4 + [C_2H_3D_2O]$	403 - 523	-	10.83±0.13	0	9.01±0.27	photol.	[660a]	768
$CH_3 + CH_3CD_2OH = CH_3D + CH_3CDOH$	403 - 523	-	11.61±0.04	0	11.40±0.09	photol.	[660a,756a]	768
$CH_3 +$ iso-$C_3H_7OH = CH_4 + C_3H_6OH$	487 - 620	-	10.84	0	7.3±0.4	photol. $(CH_3)_2CO$	[1529]	768,794
$CH_3 + (CH_3)_2CDOH = CH_4 + (CH_3)_2CDO$ and CH_2CH_3CDOH	408 - 523	-	10.69±0.08	0	9.00±0.16	photol. $(CH_3)_2CO$	[660b]	768
$CH_3 + (CH_3)_2CDOH = CH_3D + (CH_3)_2COH$	408 - 523	-	11.28±0.03	0	9.69±0.07	photol. $(CH_3)_2CO$	[660b,756a]	768
$CH_3 + (CH_3)_3CO \rightarrow (CH_3)_3COCH_3$	297 - 325	-	~13.34	0	~0	photol., est.	[1079]	
$CH_3 + CH_3SH = ?$	303	7.25_5	-	-	-	photol. $(CH_3)_2CO$	[915]	768

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + CD_3SH = CH_3D + CD_2SH$	403 - 473	-	10.88±0.05	0	8.26±0.13	photol. $(CH_3)_2CO$	[680]	768
$CH_3 + CD_3SH = CH_4 + CD_3S$	403 - 473	-	11.03±0.15	0	4.10±0.21	photol. $(CH_3)_2CO$	[680]	768
$CH_3 + CD_3SH = CH_3SH + CD_3$	403 - 473	-	10.73±0.05	0	7.60±0.15	photol. $(CH_3)_2CO$	[680]	768
$CH_3 + C_2H_5SH = ?$	303	7.54_4	-	-	-	photol. $(CH_3)_2CO$	[915]	768
$CH_3 + (CH_3)_2CHSH = ?$	303	7.61_2	-	-	-	photol. $(CH_3)_2CO$	[915]	768
$CH_3 + (CH_3)_3CSH = ?$	303	7.77	-	-	-	photol. $(CH_3)_2CO$	[915]	768
$CH_3 + (CH_3)_2O = CH_4 + CH_2OCH_3$	298 - 565	-	-	0	9.0	Hg photo.	[1052]	771,794
	373 - 523	-	-	0	8.0	photol. $(CH_3)_2$	[1237]	794
	381 - 471	-	11.36	0	9.5±0.2	photol. $(CH_3)_2CO$	[1529]	768,794
	408 - 523	-	11.62±0.08	0	9.99±0.17	"	[660b]	768
	473 - 573	-	11.04	0	9.4	Hg photo.	[1027]	863
	380 - 570	-	10.57±0.45	0	8.11±0.95	-	-	864
$CH_3 + (C_2H_5)_2O = CH_4 + C_2H_4OC_2H_5$	418 - 452	-	12.2±0.3	0	9.75±0.50	pyr. $(tert\text{-}C_4H_9O)_2$	[1025]	768
$CH_3 + (iso\text{-}C_3H_7)_2O = CH_4 + iso\text{-}C_3H_7OC_3H_6$	408 - 523	-	11.16±0.01	0	7.87±0.07	photol. $(CH_3)_2CO$	[660b]	768
	452 - 612	-	10.93	0	7.3±0.4	photol. $(CD_3)_2CO$	[1529]	768, 794
$CH_3 + (CH_2)_2O = CH_4 + CHOCH_2$	373 - 473	-	10.9	0	9.6±2	photol. $Hg(CH_3)_2$	[1237]	768,794
	373 - 523	-	10.53	0	9.45	"	[483,641]	768
	"	-	8.99	1/2	9.0	"	" "	
	423 - 523	-	10.5	0	9.0±1.0	"	[483,643]	865,794
	370 - 520	-	10.59±0.24	0	9.09±0.50	-	-	866
$CH_3 + CH_3OOCH_3 = CH_4 + CH_2OOCH_3$	393 - 455	-	12.56	0	10.0	therm.	[1502]	768,867
$CH_3 + [(CH_3)_2CHO]_2 = CH_4 + C_6H_{13}O_2$	320 - 366	-	10.5	0	6.6	pyr.	[1652]	
$CH_3 + (tert\text{-}C_4H_9O)_2 = CH_4 + tert\text{-}C_4H_9OOC_4H_8$	376 - 418	-	13.61±0.15	0	14.5±2.5	pyr. $(tert\text{-}C_4H_9O)_2$	[182]	768
	400 - 444	-	12.65±0.18	0	11.9±0.3	"	[1143]	768, R

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	403 - 428	-	12.3	0	11.7±0.3	pyr. $(tert\text{-}C_4H_9O)_2$	[1273]	768
$CH_3 + HCO = CH_4 + CO$	303	13.36	-	-	-	photol. $HCOOCH_3$	[1650]	868
	304 - 376	13.34	-	-	-	photol.	[1653]	
$CH_3 + HCHO = CH_4 + HCO$	357 - 457	-	11.06	0	6.2±0.3	photol. $(CH_3N)_2$	[1508]	768
	397 - 420	-	11.25	0	6.6	pyr. $(tert\text{-}C_4H_9O)_2$	[182]	"
	357 - 457	-	11.06±0.11	0	6.21±0.20	-	-	605
$CH_3 + DCDO = CH_3D + DCO$	350 - 454	-	11.16_5	0	7.9±0.3	photol. $(CH_3N)_2$	[1508]	768
$CH_3 + CH_3CHO = CH_4 + CH_3CO$	298 - 540	-	11.50	0	6.8	photol. $(CH_3N)_2$	[912]	768, 869
	300 - 438	-	11.2	0	6.8	"	[55]	
	321 - 391	-	-	0	6.2	photol.	[70]	
	342 - 448	-	12.06±0.07	0	7.9±0.5	"	[252]	
	346 - 438	-	11.35_5	0	6.8	photol. $(CH_3N)_2$	[55]	768
	373 - 623	-	-	0	9.8	photol. CH_3CHO	[4]	
	391 - 564	-	10.8	1/2	8.0	"	[475]	
	395 - 447	-	11.9±0.1	0	7.6±0.2	pyr. $(tert\text{-}C_4H_9O)_2$	[168]	768
	397 - 429	-	10.6	1/2	7.5±0.3	"	[230,231]	870
	"	-	12.0	0	7.5±0.3	"	[231,1524]	
	473	-	-	0	< 16	photol. CH_3CHO	[19]	871
	753 - 813	-	12.24±0.06	0	8.44±0.21	pyr. CH_3CHO	[1021]	768, 873
	796	9.93_4	-	-	-	"	[977]	768
	300 - 800	-	11.83±0.14	0	7.49±0.26	-	-	872
$CH_3 + CH_3CHO = CH_4 + CH_2CHO$	796	6.87_4	-	-	-	pyr. CH_3CHO	[977]	768
$CH_3 + CH_3CHO = CH_3COCH_3 + H$	753 - 813	-	10.22±0.07	0	12.4±0.3	pyr. CH_3CHO	[1021]	768, 874
	796	6.84_4	-	-	-	"	[977]	768
$CH_3 + CH_3CDO = CH_3D + CH_3CO$	300 - 431	-	11.0	0	7.9	photol. $(CH_3N)_2$	[55]	768
$CH_3 + C_2H_5CHO = CH_4 + C_2H_5CO$	395 - 429	-	-	0	7.5	pyr. $(tert\text{-}C_4H_9O)_2$	[1556]	
	323 - 778	-	12.0	0	7.5	photol. C_2H_5CHO	[1111]	875

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + n\text{-}C_3H_7CHO = CH_4 + n\text{-}C_3H_7CO$	395 - 447	-	11.8±0.2	0	7.3±0.3	pyr. $(tert\text{-}C_4H_9O)_2$	[168]	768
$CH_3 + iso\text{-}C_3H_7OH = CH_4 + [C_3OH_7]$	408 - 523	-	10.98±0.05	0	7.29±0.10	photol. $(CH_3)_2CO$	[660b]	768
$CH_3 + iso\text{-}C_3H_7CHO = CH_4 + iso\text{-}C_3H_7CO$	396 - 448	-	12.6±0.2	0	8.7±0.3	pyr. $(tert\text{-}C_4H_9O)_2$	[168]	768
$CH_3 + n\text{-}C_4H_9CHO = CH_4 + n\text{-}C_4H_9CO$	395 - 447	-	12.1±0.2	0	8.0±0.3	pyr. $(tert\text{-}C_4H_9O)_2$	[168]	
$CH_3 + tert\text{-}C_4H_9CHO = CH_4 + tert\text{-}C_4H_9CO$	385 - 436	-	13.1±0.3	0	10.4±0.3	pyr. $(tert\text{-}C_4H_9O)_2$	[168]	
$CH_3 + iso\text{-}C_4H_9CHO = CH_4 + iso\text{-}C_4H_9CO$	329 - 418	-	12.3	0	8.4	photol. $iso\text{-}C_4H_9CHO$	[1111]	
	399 - 444	-	12.3±0.2	0	8.4±0.3	pyr. $(tert\text{-}C_4H_9O)_2$	[168]	768
$CH_3 + sec\text{-}C_4H_9CHO = CH_4 + sec\text{-}C_4H_9CO$	392 - 436	-	13.0±0.3	0	10.2±0.3	pyr. $(tert\text{-}C_4H_9O)_2$	[168]	768,876
CH_3 + crotonaldehyde = $CH_4 + CH_2{=}CHCH_2CO$	395 - 448	-	13.3	0	10.9	pyr. $(tert\text{-}C_4H_9O)_2$	[168]	768
$CH_3 + C_3H_5CHO$ (crotonaldehyde) = $C_4H_8\text{-}2 + HCO$	393 - 523	-	11.78	0	7.45	photol. $(CH_3)_2CO$	[14]	768
$CH_3 + CH_3COCH_3 = CH_4 + CH_2COCH_3$	271 - 439	-	11.60	0	9.74_5	photol. $(CH_3)_2CO$	[1043]	768
	room	4.76	-	-	-	photol. $(CH_3)_2CO$ and with $(CH_3N)_2$	[57]	"
	299 and 395	-	9.44	0	6.1	photochem.	[484]	877,768
	300 - 685	-	11.60	0	9.8±0.4	photol. $(CH_3)_2CO$	[332]	768
	330 - 413	-	11.2	0	9.1	photol. $(CH_3)_2CO$ and with $(CH_3N)_2$	[57]	"
	353 - 523	-	11.70	0	9.9	photol. $(CH_3)_2CO$	[266]	768
	373 - 548	-	11.5	0	9.6±0.4	"	[1360,1524]	
	373 - 573	-	11,52	0	9,7	"	[1527]	768
	386 - 573	-	11.56	0	9.87	-	[340]	"
	393 - 483	-	10.67	0	8.06	photol. $(CH_3)_2CO$	[1017]	
	394 - 571	-	11.47±0.21	0	9.44±0.35	photol.	[1396]	878

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	394 - 573	-	11.49	0	$9.7_2 \pm 0.1$	photol. $(CH_3)_2CO$	[1527]	768,794
	395 - 473	-	11.47	0	9.6	"	[1180]	768
	395 - 526	-	11.35	0	9.53 ± 0.16	"	[1501]	"
	395 - 573	-	11.50	0	9.7	"	[1530]	"
	398 and 448	-	10.25_5	1/2	9.5	"	[641]	879
	"	-	11.8	0	9.7 ± 0.2	-	[641,1524]	
	398 - 473	-	11.35 ± 0.08	0	9.53 ± 0.16	photol. $(CH_3)_2CO$	[680]	768
	400 - 448	-	11.5	0	9.5 ± 1.5	pyr. $(tert\text{-}C_4H_9O)_2$	[832]	794
	400 - 565	-	11.52_5	0	9.5	photol. $(CH_3)_2CO$	[1292]	
	403 - 428	-	11.8	0	9.5 ± 0.3	pyr. $(tert\text{-}C_4H_9O)_2$	[1273]	880
	403 - 503	-	11.42 ± 0.04	0	9.43 ± 0.07	photol. $(CH_3)_2CO$	[509]	768
	403 - 523	-	11.46 ± 0.07	0	9.64 ± 0.08	"	[660a]	768
	403 - 563	-	11.53	0	9.7	"	[1597]	"
	405 - 565	-	11.43	0	9.5 ± 0.1	"	[1039,1041]	"
	406 - 472	-	11.35 ± 0.07	0	9.3 ± 0.1	"	[1391]	"
	407	6.30	-	-	-	pulse photol. $(CH_3)_2CO$	[1048]	
	428 - 642	-	11.7	0	9.8	photol. $(CH_3)_2CO$	[432]	880
	433 - 573	-	-	0	~8.6	"	[1473]	
	471	7.03	-	-	-	photol. $(CH_3)_2CO$	[755]	768
	473 - 623	-	11.56	0	9.8 ± 0.1	"	[429]	"
	544 - 712	-	11.59	0	9.75	"	[1043]	
	350 - 710	-	11.59	0	9.87	-	[1737]	881, R
$CH_3 + CD_3COCD_3 = CH_3D + CD_2COCD_3$	739 - 798	-	11.71	0	11.54	pyr. $(CH_3)_2CO$	[1085]	882
$CH_3 + CH_3COC_2H_5 = CH_4 + CH_3COC_2H_4$	299 - 448	-	10.74	0	7.4	photol. $(CH_3N)_2$	[58]	768
	352 - 507	-	-	0	7.4 ± 0.1	photol. $CH_3COC_2H_5$	"	
$CH_3 + (C_2H_5)_2CO = CH_4 + C_2H_4COC_2H_5$	299 - 407	-	11.04	0	7.0 ± 0.1	photol. $(CH_3N)_2$	[53]	768,794
	403 - 428	-	11.7	0	8.0 ± 0.2	pyr. $(tert\text{-}C_4H_9O)_2$	[1273]	" "
	300 - 430	-	11.40 ± 0.23	0	7.51 ± 0.39	-	-	883
$CH_3 + cyclo\text{-}C_3H_5CHO = CH_4 + cyclo\text{-}C_3H_5CO$	375 - 477	-	12.33 ± 0.03	0	8.70 ± 0.07	photol. $(CH_3N)_2$	[681]	768
$CH_3 + CH_3COOD = CH_4 + CH_2COOD$	429 - 558	-	11.22	0	10.2	photol. CH_3COOD	[59]	768

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + HCOOCH_3 = CH_4 + CH_3OCO$	393 - 483	-	10.86	0	9.0	photol. $(CH_3)_2CO$	[1495]	884,768
	"	-	10.69	0	8.6	"	"	" "
	-	-	11.3	0	9.8	-	"	884
$CH_3 + HCOOC_2H_5 = CH_4 + C_2H_5OCO$	370 - 510	-	10.5	0	8.2	photol. $(CH_3)_2CO$	[1495]	768
$CH_3 + HCOO\text{-}n\text{-}C_3H_7 = CH_4 + n\text{-}C_3H_7OCO$	347 - 455	-	10.1	0	7.3	photol. $(CH_3)_2CO$	[1496]	884,768, R
	"	-	9.7	0	6.5	"	"	" "
	"	-	9.8	0	6.7	"	"	" "
$CH_3 + HCOO\text{-}iso\text{-}C_3H_7 = CH_4 + iso\text{-}C_3H_7OCO$	347 - 455	-	10.9	0	8.9	photol. $(CH_3)_2CO$	[1496]	768
$CH_3 + HCOO\text{-}n\text{-}C_4H_9 = CH_4 + n\text{-}C_4H_9OCO$	348 - 457	-	10.6	0	8.2	photol. $(CH_3)_2CO$	[1497]	884,768
	348 - 457	-	10.8	0	8.1	photol. CH_3COCH_3	[1497]	768
$CH_3 + CH_3COOCH_3 = CH_4 + CH_2COOCH_3$	336 - 490	-	11.24	0	10.0	photol. CH_3COOCH_3	[1601]	768
$CH_3 + CH_3COOCD_3 = CH_4 + CH_2COOCD_3$	418 - 623	-	11.08	0	10.0 ± 0.5	photol. CH_3COOCD_3	[1603]	768
$CH_3 + CH_3OCOOCH_3 = CH_4 + CH_2OCOOCH_3$	314 - 366	-	10.19	0	7.36	photol. $CH_3OCOOCH_3$	[1649]	768
	393 - 517	-	10.24 ± 0.24	0	8.8 ± 0.5	photol. $(CH_3)_2CO$	[1501]	"
$CH_3 + CH_3COCOCH_3 = CH_4 + CH_2COCOCH_3$	301 - 473	-	-	0	7.1 ± 0.2	photol. $(CH_3CO)_2$	[173]	771,794
	350 - 477	-	11.32	0	8.5	"	[56]	768
$CH_3 + CH_3COCOCH_3 = CH_3COCH_3 + CH_3CO$	301 - 473	-	10.68	0	5.6	photol. $(CH_3CO)_2$	[173,1523]	771
CH_3 + methylcyclohexadienone $= CH_4 + CH_3C_6H_4O$	445 - 547	-	~ 13.2	0	8 ± 2	pyr. $(tert\text{-}C_4H_9O)_2$	[1159]	768
$CH_3 + C_6H_5OH = CH_4 + C_6H_5O$	445 - 547	-	~ 11.4	0	8 ± 2	pyr. $(tert\text{-}C_4H_9O)_2$	[1159]	768

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + C_6H_5OCH_3 = CH_4 + C_6H_5OCH_2$	453 - 539	-	11.7±0.3	0	10.5±0.8	pyr. $(tert\text{-}C_4H_9O)_2$	[1154]	768
$CH_3 + CF_3 = CH_2CF_2 + HF$	296 - 513	-	-	0	1.1	photol. $(CF_3)_2CO$	[9,627]	885
	423	-	-	-	-	"	[627]	886
$CH_3 + CH_3F = CH_4 + CH_2F$	398 - 484	-	11.17	0	8.7±0.3	photol. $(CH_3)_2CO$	[1292]	768,794, 887
$CH_3 + CH_2F_2 = CH_4 + CHF_2$	402 - 465	-	9.85	0	6.2±0.3	photol. $(CH_3)_2CO$	[1292]	768,794
$CH_3 + CH_3Cl = CH_4 + CH_2Cl$	400 - 480	-	11.54	0	9.4±0.3	photol. $(CH_3)_2CO$	[1292]	768,794
$CH_3 + CH_2Cl_2 = CH_4 + CHCl_2$	402 - 484	-	10.82	0	7.2±0.3	photol. $(CH_3)_2CO$	[1292]	768,794
$CH_3 + CHCl_3 = CH_4 + CCl_3$	303	6.94	-	-	-	photol. $(CH_3)_2CO$	[424]	768,794
	405 - 476	-	10.27	0	5.8±0.3	"	[1292]	" "
$CH_3 + CCl_4 = CH_3Cl + CCl_3$	363 - 413	-	13.2	0	13.4±0.8	pyr. $(tert\text{-}C_4H_9O)_2$	[1512]	768
	363 - 418	-	13.37	0	12.9±0.7	pyr. $(tert\text{-}C_4H_9O)_2$	[1489]	768
$CH_3 + CH_3Br = CH_4 + CH_2Br$	394 - 481	-	12.10	0	10.1±0.3	photol. $(CH_3)_2CO$	[1292]	768,794
$CH_3 + CH_2Br_2 = CH_4 + CHBr_2$	399 - 450	-	12.73	0	8.7±0.3	photol. $(CH_3)_2CO$	[1292]	768,794
$CH_3 + CBr_4 = CH_3Br + CBr_3$	363 - 418	-	14.17	0	7.9±1.1	pyr.	[1489]	768
$CH_3 + CH_3I = CH_3I + CH_3$	543 - 583	-	10.46	0	1.2	therm.	[1448,1192]	888
	"	-	10,68	0	1.2	"	[1448]	889
$CH_3 + CF_3Br = CH_3Br + CF_3$	363 - 418	-	13.27	0	12.5±1.0	pyr.	[1489]	768
$CH_3 + CF_2Br_2 = CH_3Br + CF_2Br$	363 - 418	-	10.97	0	6.4±1.0	pyr.	[1489]	768
$CH_3 + CF_3I = CH_3I + CF_3$	363 - 418	-	13.77	0	7.5±1.0	pyr.	[1489]	768

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + CCl_3Br = CH_3Br + CCl_3$	363 - 418	-	13.17	0	7.1±0.9	pyr.	[1489]	768
$CH_3 + CCl_2Br_2 = CH_3Br + CCl_2Br$	363 - 418	-	13.77	0	7.6±1.1	pyr.	[1489]	768
$CH_3 + C_2Cl_6 = CH_3Cl + C_2Cl_5$	363 - 408	-	11.4	0	10.2±0.5	pyr. $(tert\text{-}C_4H_9O)_2$	[1512]	768
	363 - 418	-	11.77	0	10.1±0.9	"	[1489]	"
$CH_3 + SiHCl_3 = CH_4 + SiCl_3$	303 - 393	-	13.42±0.06	0	8.49±0.09	photol. $(CH_3N)_2$	[914]	768
$CH_3 + CH_3SiHCl_2 = CH_4 + CH_3SiCl_2$	315 - 396	-	11.77±0.12	0	7.24±0.80	photol. $(CH_3N)_2$	[914]	768
$CH_3 + CH_3SiCl_3 = CH_4 + CH_2SiCl_3$	378 - 478	-	12.88±0.17	0	11.50±0.30	photol. $(CH_3N)_2$	[914]	768
$CH_3 + CF_3CHO = CH_4 + CF_3CO$	401 - 445	-	12.10±0.16	0	8.7±0.3	pyr. $(tert\text{-}C_4H_9O)_2$	[1143]	768
$CH_3 + C_2F_5CHO = CH_4 + C_2F_5CO$	398 - 438	-	12.93±0.21	0	9.8±0.3	pyr. $(tert\text{-}C_4H_9O)_2$	[1143]	768
$CH_3 + C_3F_7CHO = CH_4 + C_3F_7CO$	398 - 438	-	13.19±0.18	0	10.3±0.4	pyr. $(tert\text{-}C_4H_9O)_2$	[1143]	768
$CH_3 + CH_2FCOCH_3 = CH_4 + CHFCOCH_3$ or CH_2FCOCH_2	329 - 585	-	10.13	0	4.6	photol.	[1281]	768
$CH_3 + CH_3COCF_3 = CH_4 + CH_2COCF_3$	299 - 409	-	11.07	0	8.9	photol. CH_3COCF_3	[1405]	768
$CH_3 + (CF_3)_2CO = CH_3COCF_3 + CF_3$	436 - 638	-	8.78	0	6	photol. $(CH_3N)_2$	[1277]	768
$CH_3 + CCl_3COCCl_3 = CH_3Cl + CCl_2COCCl_3$	363 - 418	-	12.57	0	9.7±0.8	pyr. $(tert\text{-}C_4H_9O)_2$	[1489]	768
	368 - 408	-	12.3	0	9.8±0.4	"	[1512]	"
$CH_3 + C_6H_5CCl_3 = CH_3Cl + C_6H_5CCl_2$	363 - 418	-	10.27	0	7.6±0.8	pyr. $(tert\text{-}C_4H_9O)_2$	[1489]	768

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
CH_3 + para-$F\text{-}C_6H_5CH_3$ = = CH_4 + para-$F\text{-}C_6H_4CH_2$	606 - 733	-	9.53 ± 0.27	0	5.7 ± 0.4	photol. $(CH_3)_2CO$	[1642]	768, 851
CH_3 + ortho-$F\text{-}C_6H_5CH_3$ = = CH_4 + ortho-$F\text{-}C_6H_4CH_2$	604 - 734	-	9.67 ± 0.22	0	6.0 ± 0.4	photol. $(CH_3)_2CO$	[1642]	768, 851
CH_3 + meta-$F\text{-}C_6H_5CH_3$ = = CH_4 + meta-$F\text{-}C_6H_4CH_2$	613 - 721	-	10.32 ± 0.10	0	7.1 ± 0.2	photol. $(CH_3)_2CO$	[1642]	768, 851
$CH_3 + CCl_3CN = CH_3Cl + CCl_2CN$	363 - 418	-	12.87	0	10.4 ± 1.0	pyr. $(tert\text{-}C_4H_9O)_2$	[1489]	768
$CH_3 + CH_3NH_2 = CH_4 + CH_2NH_2$	388 - 448	-	10.99 ± 0.37	0	8.7 ± 0.7	therm.	[671]	768
	456 - 617	-	11.15	0	8.4 ± 0.4	photol. $(CD_3)_2CO$	[1529]	768, 794
	388 - 617	-	11.73 ± 0.47	0	9.97 ± 1.00	-	-	890
$CH_3 + CH_3NH_2 = CH_4 + CH_3NH$	388 - 448	-	9.55 ± 0.22	0	5.7 ± 0.4	therm.	[671]	768
$CH_3 + CH_3NH_2 = CH_4 + [CNH_4]$	388 - 448	-	10.59 ± 0.12	0	7.2 ± 0.2	therm.	[671]	768, 891
	398 - 430	-	10.745	0	7.6	pyr. $[(CH_3)_3CO]_2$	[227]	768
	388 - 448	-	10.64 ± 0.10	0	7.30 ± 0.18	-	-	892
$CH_3 + CH_3ND_2 = CH_4 + CH_2ND_2$	388 - 448	-	11.15 ± 0.12	0	9.0 ± 0.2	therm.	[671]	768
$CH_3 + CH_3ND_2 = CH_3D + CH_3ND$	388 - 448	-	9.61 ± 0.16	0	7.0 ± 0.3	therm.	[671]	768
$CH_3 + CD_3NH_2 = CH_3D + CD_2NH_2$	398 - 448	-	10.86 ± 0.16	0	10.1 ± 0.3	therm.	[671]	768
$CH_3 + CD_3NH_2 = CH_4 + CD_3NH$	398 - 448	-	9.77 ± 0.28	0	6.0 ± 0.5	therm.	[671]	768
$CH_3 + (CH_3)_2NH = CH_4 + (CH_3)_2N$	393 - 453	-	10.81 ± 0.21	0	6.4 ± 0.3	photol. $(CH_3N)_2$	[667]	768
$CH_3 + (CH_3)_2NH = CH_4 + [C_2NH_6]$	393 - 453	-	11.20 ± 0.13	0	7.0 ± 0.3	photol. $(CH_3N)_2$	[667]	768, R
	398 - 430	-	11.545	0	7.2	pyr. $[tert(CH_3)_3CO]_2$	[227]	768
	457 - 614	-	11.15	0	7.2 ± 0.4	photol. $(CD_3)_2CO$	[1529]	768, 794

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + (CH_3)_2ND = CH_4 + CH_2NDCH_3$	393 - 453	-	11.46±0.28	0	8.7±0.6	photol. $(CH_3N)_2$	[667]	768
$CH_3 + (CH_3)_2ND = CH_3D + (CH_3)_2N$	393 - 453	-	10.65±0.22	0	7.8±0.4	photol. $(CH_3N)_2$	[667]	768
$CH_3 + (CH_3)_3N = CH_4 + CH_2(CH_3)_2N$	405 - 542	-	11.37	0	8.0	photol. $(C_2H_5)_3N$	[959]	768
	466 - 575	-	11.71	0	8.8	photol. $(CD_3)_2CO$	[1529]	768,794
	405 - 575	-	11.49±0.11	0	8.25±0.25	-	-	893
$CH_3 + C_2H_5NH_2 = CH_4 + CH_3CHNH_2$	383 - 453	-	11.2	0	8.1	photol. $(CH_3N)_2$	[665]	768,894
$CH_3 + C_2H_5NH_2 = CH_4 + C_2H_5NH$	383 -453	-	9.93±0.46	0	6.48±0.86	photol. $(CH_3N)_2$	[665]	768
$CH_3 + C_2H_5NH_2 = CH_4 + [C_2NH_6]$	383 - 453	-	10.89±0.18	0	7.31±0.34	photol. $(CH_3N)_2$	[665]	768, R
	398 - 430	-	11.045	0	7.1	pyr. $[(CH_3)_3CO]_2$	[227]	768
$CH_3 + C_2H_5ND_2 = CH_3D + C_2H_5ND$	383 - 453	-	10.04±0.21	0	7.64±0.4	photol. $(CH_3N)_2$	[665]	768
$CH_3 + C_2H_5ND_2 = CH_4 + C_2H_4ND_2$	383 - 453	-	11.17±0.24	0	8.12±0.46	photol. $(CH_3N)_2$	[665]	768
$CH_3 + CD_3CH_2NH_2 = CH_4 + [CD_3CNH_3]$	383 - 453	-	10.93±0.27	0	7.34±0.51	photol. $(CH_3N)_2$	[665]	768
$CH_3 + (C_2H_5)_2NH = CH_4 + C_2H_5NHC_2H_4$	396 - 522	-	10.71	0	5.7±1	photol. $(C_2H_5)_3N$	[959]	768,895
$CH_3 + (C_2H_5)_2NH = CH_4 + (C_2H_5)_2N$	398 - 430	-	11.645	0	7.2	pyr. $[(CH_3)_3CO]_2$	[227]	768
$CH_3 + (C_2H_5)_3N = CH_4 + (C_2H_5)_2NC_2H_4$	396 - 536	-	10.39	0	5.3±1	photol. $(C_2H_5)_3N$	[959]	768,895
$CH_3 + (\text{iso}-C_3H_7)_2NH = CH_4 + (\text{iso}-C_3H_7)_2N$	398 - 430	-	11.845	0	7.8	pyr. $[(CH_3)_3CO]_2$	[227]	768
$CH_3 + \text{tert}-C_4H_9NCHCH_3 = CH_4 + [C_6H_{12}N]$	398 - 430	-	11.1	0	7.8	pyr.	[227]	880

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + NH_2CH_2CH_2NH_2 =$ $= CH_4 + C_2N_2H_7$	363 - 448	-	11.01±0.06	0	7.16±0.11	photol. $(CH_3N)_2$	[661]	768
$CH_3 + NH_2CH_2CH_2NH_2 =$ $= CH_4 + NHCH_2CH_2NH_2$	363 - 448	-	10.28±0.17	0	6.79±0.32	photol. $(CH_3N)_2$	[661]	896
$CH_3 + NH_2CH_2CH_2NH_2 =$ $= CH_4 + NH_2CHCH_2NH_2$	363 - 448	-	10.9±0.1	0	7.3±0.2	photol. $(CH_3N)_2$	[661]	897
$CH_3 + ND_2CH_2CH_2\ D_2 =$ $= CH_4 + ND_2CHCH_2ND_2$	363 - 440	-	10.93±0.11	0	7.31±0.21	photol. $(CH_3N)_2$	[661]	768
$CH_3 + ND_2CH_2CH_2ND_2 =$ $= CH_3D + NDCH_2CH_2ND_2$	363 - 448	-	10.34±0.10	0	7.87±0.18	photol. $(CH_3N)_2$	[661]	768
$CH_3 + CH_3NC = CH_3CN +$ $+ CH_3$	358 - 403	-	12.25	0	7.8±0.3	pyr. $(tert\text{-}C_4H_9O)_2$	[1395]	
$CH_3 + H_2\underset{\underset{H}{N}}{C{-}C}H_2$ (ethylene-imine) = $= CH_4 + H_2\underset{N}{C{-}C}H_2$	383 - 448	-	10.17±0.05	0	4.57±0.1	photol. $(CH_3N)_2$	[664,663]	768
CH_3 + ethyleneimine = $= CH_4 + [C_2NH_4]$	383 - 448	-	10.29±0.23	0	4.77±0.44	photol. $(CH_3N)_2$	[664,663]	768
	403 - 431	-	10.49_5	0	4.8±0.3	pyr. $(tert\text{-}C_4H_9O)_2$	[229,227]	768,794
	383 - 448	-	10.45±1.12	0	4.90±2.16	-		898
$CH_3 + H_2\underset{\underset{D}{N}}{C{-}C}H_2 = CH_3D +$ $+ C_2H_4N$	383 - 448	-	10.17±0.13	0	6.34±0.21	photol. $(CH_3N)_2$	[664,663]	768
$CH_3 + H_2\underset{\underset{D}{N}}{C{-}C}H_2 = CH_4 +$ $+ C_2H_3ND$	383 - 448	-	11.44±1.48	0	10.1±2.8	photol. $(CH_3N)_2$	[664,663]	768
$CH_3 + tert\text{-}C_4H_9\text{-}H\underset{\underset{H}{N}}{C{-}C}H_2 =$ $= CH_4 + [C_6NH_{12}]$	398 - 430	-	~ 9.45	0	~ 6.6	pyr. $[(CH_3)_3CO]_2$	[227]	768
$CH_3 + CH_3NHNH_2 = CH_4 +$ $+ [CH_5N_2]$	359 - 454	-	9.69±0.15	0	1.72±0.28	photol. $(CH_3N)_2$	[662]	768
CH_3 + ethyleneimine = $CH_4 + (CH_3)_2NNH$	385 - 448	-	11.29±0.10	0	5.75±0.1	photol, $(CH_3N)_2$	[662]	768

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + (CH_3)_2NNH_2 =$ $= CH_4 + CH_3CH_2NNH_2$	383 - 453	-	11.6	0	8.5	photol. $(CH_3N)_2$	[672]	768
$CH_3 + (CH_3)_2NNH_2 =$ $= CH_4 + [C_2N_2H_7]$	383 - 443	-	11.44±0.24	0	5.97±0.46	photol. $(CH_3N)_2$	[662]	768
	383 - 453	-	11.34±0.12	0	5.8-0.2	"	[672]	"
$CH_3 + CH_3NHNHCH_3 =$ $= CH_4 + CH_3NNHCH_3$	353 - 433	-	9.92±0.10	0	2.12±0.18	photol. $(CH_3N)_2$	[662]	768
$CH_3 + CH_3NHNHCH_3 =$ $= CH_4 + [C_2N_2H_7]$	352 - 435	-	10.20±0.29	0	2.49±0.52	photol. $(CH_3N)_2$	[662]	768
$CH_3 + (CH_3)_2NND_2 =$ $= CH_3D + (CH_3)_2NND$	385 - 448	-	11.33±0.21	0	6.82±0.4	photol. $(CH_3N)_2$	[662]	768
$CH_3 + (CH_3)_2NND_2 =$ $= CH_4 + CH_3CH_2NND_2$	385 - 448	-	10.95±1.15	0	7.2±2.2	photol. $(CH_3N)_2$	[662]	768
$CH_3 + CH_3NDNDCH_3 =$ $= CH_3D + CH_3NNDCH_3$	353 - 453	-	10.00±0.24	0	2.88±0.44	photol. $(CH_3N)_2$	[662]	768
$CH_3 + CH_3NDNDCH_3 =$ $= CH_4 + CH_2NDNDCH_3$	353 - 433	-	11.6	0	6.6	photol. $(CH_3N)_2$	[662]	768
$CH_3 + (CH_3)_3C{-}N{=}CH{-}CH_3 =$ $= CH_4 + [C_6NH_{12}]$	398 - 430	-	10.945	0	7.8	pyr. $[(CH_3)_3CO]_2$	[227]	768
$CH_3 + CH_3NNCH_3 = CH_4 +$ $+ CH_2NNCH_3$	298 - 434	-	-	0	7.3	photo-ox. $CH_3N_2CH_3$	[791]	771
	298 - 437	-	11.55±0.10	0	8.7±0.2	photol. $(CH_3N)_2$	[644]	768
	298 - 453	-	-	0	7.5±0.3	"	[1510]	771
	299 - 407	-	10.49	0	7.3	"	[53,55]	768
	305 - 398	-	11.40	0	8.4±0.3	"	[1508]	"
	323 - 453	-	11.47	0	8.7	"	[1509]	768,899
	"	-	11.47 или 11.20	0	8.2	"	[1509,661]	899
	333	6.00±0.04	-	-	-	"	[338]	768
	337 - 431	-	10.87±0.11	0	7.8±0.2	"	[914]	"
	338 - 451	-	10.8	0	7.6±0.2	"	[865]	768,794
	"	-	11.15	0	8.2	"	[865,1509]	768,900
	338 - 468	-	10.97±0.04	0	7.83±0.08	"	[1498]	768
	355 - 453	-	10.93±0.11	0	7.84±0.19	"	[671]	"

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	363 - 448	-	11.26±0.17	0	8.26±0.36	photol. $(CH_3N)_2$	[661]	768
	363 - 453	-	10.94±0.26	0	7.8±0.4	"	[673,672]	"
	373 - 453	-	11.47	0	8.7	"	[1509]	"
	373 - 523	-	10.35±0.14	0	6.86±0.18	"	[1507]	768,901
	383 - 448	-	10.85±0.10	0	7.83±0.20	"	[664,663]	768
	383 - 470	-	10.97±0.04	0	7.88±0.08	"	[681]	"
	393 - 448	-	11.03±0.06	0	8.2±0.1	"	[667]	"
	436 - 468	-	10.82	0	7.6	"	[1277]	"
	300 - 470	-	10.96_5±0.12	0	7.825±0.22	-	-	902
$CH_3 + CH_3CH{=}N{-}N{=}CHCH_3 = CH_4 + [C_4N_2H_7]$	398 - 430	-	10.345	0	6.1	pyr. $[(CH_3)_3CO]_2$	[227]	768
$CH_3 + NH_2CHO = CH_4 + NH_2CO$	443 - 520	-	10.5	0	6.6	photol. $(CH_3)_2CO$	[286]	
$CH_3 + NHCH_3CHO = CH_4 + NHCH_3CO$	434 - 560	-	10.9	0	7.6	photol. $(CH_3)_2CO$	[286]	
$CH_3 + (CH_3)_2NCHO = CH_4 + (CH_3)_2NCO$	393 - 571	-	11.4	0	8.3	photol. $(CH_3)_2CO$	[286]	
$CH_3 + CH_3ONH_2 = CH_4 + CH_3ONH$	343 - 463	-	10.70±0.15	0	4.53±0.25	photol $(CH_3N)_2$	[1498]	768
$CH_3 + CH_3ONH_2 = CH_4 + CH_2ONH_2$	343 - 463	-	-	0	~6.6	photol. $(CH_3N)_2$	[1498,1499]	
$CH_3 + CH_3OND_2 = CH_3D + CH_3OND$	343 - 463	-	10.55±0.12	0	5.88±0.22	photol $(CH_3N)_2$	[1498]	768
CH_3 + azoxymethane = $CH_4 + CH_2NONCH_3$	300 - 394	-	~ 11	0	6±2	photol. $(CH_3N)_2$	[652]	
$CH_3 + CH_3SO_2 = CH_4 + CH_2SO_2$	298	-	-	-	-	photol. $(CH_3N)_2$	[644]	903
$CH_3 + Cd(CH_3)_2 = CH_4 + CH_2CdCH_3$	423 - 548	-	~ 12.85	0	14±2	photol. $Cd(CH_3)_2$	[29]	794
$CH_3 + Hg(CH_3)_2 = CH_4 + CH_2HgCH_3$	312 - 401	-	11.50	0	9.65	pyr.	[1570]	
	373 - 523	-	-	0	7.4	photol. $(CH_3)_2CO$	[1360]	904
	"	-	11.49	0	10.8±0.3	photol. $Hg(CH_3)_2$	[1307,1308]	768,794

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	443	6.24	-	-	-	photol. $(CH_3)_2$	[797]	768
	448 - 493	-	10.22	1/2	9	"	[642]	
	"	-	10.77	0	8.7	"	[642,483]	
	"	-	9.61	1/2	9	"	[641,483]	
	"	-	11.30	0	9.0 ± 0.5	"	[642,1524]	768
	"	-	11.7	0	10.8	"	[1524,642]	
	825	~10.1	-	-	-	pyr. $Hg(CH_3)_2$	[653]	768
	370 - 520	-	11.91 ± 0.72	0	11.40 ± 1.48	-	-	905
$CH_3 + Hg(CH_3)_2 = C_2H_6 + HgCH_3$ or $C_2H_6 + Hg + CH_3$	373 - 523	-	6.84_5	0	1.0	photol. $(CH_3)_2$	[642]	
	448 and 493	-	8.66	0	2.9	"	[483,642]	906
	"	-	8.37 ± 0.72	0	2.3 ± 1.5	"	[642]	907
$CH_3 + Al(CH_3)_3 = CH_4 + CH_2Al(CH_3)_2$	571 - 607	-	-	0	≤ 15	therm.	[1648]	
$CH_3 + Pb(CH_3)_4 = CH_4 + \ldots$	513 - 644	-	13.54	0	14.00	pyr.	[786]	
$CH_3 + CO = CH_3CO$	273 - 335	-	8.58	0	3.9	photol. $(CH_3N)_2$	[912]	768, R
	295 - 400	-	8.15	0	3.84	photol. $CH_3N_2CH_3$	[297]	908
$CH_3 + CO + M = CH_3CO + M$	298 - 338	-	8.4	0	-4.1	photol. $(CH_3N)_2$	[912]	768,909
$CH_3 + NO = CH_3NO$	293	11.8 ± 0.5	-	-	-	photol. CH_3I	[351]	
	298	11.80	-	-	-	pulse photol. $(CH_3N)_2$	[1412]	910
$CH_3 + NO + He = CH_3NO + He$	1173	18.00_5	-	-	-	pyr. $Hg(CH_3)_2$	[251,782]	
$CH_3 + NO + CH_3I = CH_3NO + CH_3I$	293	18.5 ± 0.5	-	-	-	photol. CH_3I	[351]	911
$CH_3 + NO + CH_3COCH_3 = CH_3NO + CH_3COCH_3$	473	16.97	-	-	-	photol. $(CH_3)_2CO$	[342,782]	768
$CH_3 + NO + [(CH_3)_3CO]_2 = CH_3NO + [(CH_3)_3CO]_2$	room	18.49	-	-	-	pyr. $[(CH_3)_3CO]_2$	[493,782]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + NO + (Tp\text{-}C_4H_9O)_2 = CH_3NO + (Tp\text{-}C_4H_9O)_2$	473	18.51	-	-	-	-	[787]	912
$CH_3 + NO \rightarrow CH_3NO$	289 - 293	11.84	-	-	-	photol. CH_3I	[351,352]	913
	298	11.78	-	-	-	pulse photol. $(CH_3N)_2$	[1412]	914
	"	≥ 11.7	-	-	-	photol. CH_3I	[354]	915
	301	11.19	-	-	-	photol. $Hg(CH_3)_2$	[1122]	768,916
	323	10.52	-	-	-	pyr. $(tert\text{-}C_4H_9O)_2$	[493]	917,918
	433	10.45	-	-	-	pyr. $[(CH_3)_3CO]_2$	[171]	768
	753	11.11	-	-	-	pyr. $Hg(CH_3)_2$	[251]	919
	813	11.45	-	-	-	pyr. $(CH_3)_2O$	[1422]	
	1073	10.05	-	-	-	"	[578]	
	"	11.15	-	-	-	pyr. $Hg(CH_3)_2$	[251]	919
	1223	10.93 ± 0.13	-	-	-	pyr. $(CH_3)_2O$	[1026]	
$CH_3 + NO_2 \rightarrow CH_3NO_2$	323 and 363	-	-	0	~0	therm.	[1245]	811,920
	363	12.23	-	-	-	"	"	
	443	12.04	-	-	-	pyr. $(tert\text{-}C_4H_9O)_2$, flow	[1770]	768
$CH_3 + O_2 = CH_3O_2$	473	≥ 11.3	-	-	-	photol. $(CH_3)_2CO$	[351, 352, 787]	
$CH_3 + O_2 + CO_2 = CH_3OO + CO_2$	293	15 - 16	-	-	-	photol. CH_3I	[350]	921,922
	473	~15.8	-	-	-	photol. $(CH_3)_2CO$	[787]	
$CH_3 + O_2 + CH_3I = CH_3OO + CH_3I$	293	16.03	-	-	-	photol. CH_3I	[350, 351, 352]	923
$CH_3 + O_2 + CH_3COCH_3 = CH_3OO + CH_3COCH_3$	373 - 573	16.70	-	-	-	pyr. $(CH_3)_2CO$	[1694]	
	473	16.76	-	-	-	photol. $(CH_3)_2CO$	[787]	924
	"	~ 16.3	-	-	-	"	[351,352,787]	
	473 - 573	16.64 ± 0.11	-	-	-	"	[103]	925
$CH_3 + O_2 + CH_3NNCH_3 = CH_3OO + CH_3NNCH_3$	298	16.57	-	-	-	pulse photol. $(CH_3N)_2$	[1412]	768
	396	16.80	-	-	-	photochem.	[791]	"
	434	16.88	-	-	-	"	"	"
$CH_3 + O_2 + M = CH_3O_2 + M$	298	16.57_5	-	-	-	pulse photol. $(CH_3N)_2$	[1412]	926,927
	373 - 573	16.69	-	-	~0	pyr. $(CH_3)_2CO$	[1694]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	473 and 523	-	-	-	-	photochem.	[789]	928
$CH_3 + O_2 \rightarrow CH_3O_2$	273	-	-	-	-	photochem.	[179]	929
	373 - 573	10.68	-	-	~0	pyr. $(CH_3)_2CO$	[1694]	
	378	10.35±0.09	-	-	-	therm.	[1769]	768
	393 - 473	-	11.08	0	0.57	photol. $(CH_3)_2CO$	[1050]	814
	396 and 434	-	-	0	~0.4	photochem.	[791]	930
$CH_3 + SO_2 \rightarrow CH_3SO_2$	294 - 312	-	10.82±0.18	0	1.5±0.25	photol. $(CH_3N)_2$	[644]	768
$CH_3 + CH_3SO_2 \rightarrow$ $\rightarrow CH_3SO_2CH_3$	298	10.48	-	-	-	photol. $(CH_3N)_2$	[644]	
$CH_3 + CH_3 = C_2H_6$	298 - 1248	-	12.30±0.03	1/2	0	-	[1396]	931
	420 - 520	-	12.0	1/2	0	-	[1737]	932
	473	13.57	-	-	-	pyr.	[351,352,477, 935]	
	873	≤ 13.08	-	-	-	calc.	[1717]	
$CH_3 + CH_3 + (CH_3)_2CO =$ $= C_2H_6 + CH_3COCH_3$	373 - 573	-	21.04	0	0	pyr. $(CH_3)_2CO$	[1694]	
	420 - 520	-	16.65	1	-2.43±0.5	photol. $(CH_3)_2CO$	[1737]	934
	473	20.68	-	-	-	pyr.	[351,352, 477,935]	
$CH_3 + CH_3 + Hg(CH_3)_2 =$ $= C_2H_6 + Hg(CH_3)_2$	312 - 411	15.32	-	-	-	pyr.	[1570]	
$CH_3 + CH_3 \rightarrow C_2H_6$	room	13.56±0.14	-	-	-	Hg' + CH_3COCH_3	[1151]	935
	330	13.68	-	-	-	photol. $Hg(CH_3)_2$	[907]	936
	398 ÷ 448	13.64	-	-	0 ± 0.7	photol. $(CH_3)_2CO$	[641]	937
	"	13.34	-	-	-	"	[641,1401]	"
	407	13.37	-	-	-	pulse photol. $(CH_3)_2CO$	[1048]	
	408 and 438	13.57	-	-	-	photol. $(CH_3)_2CO$	[935]	938
	"	13.34	-	-	-	"	[935,1401]	"
	448	13.84	-	-	-	photol. $Hg(CH_3)_2$	[639]	939
	493	13.82	-	-	-	"	[641]	940
$CH_3 + CD_3 \rightarrow CH_3CD_3$	303 and 363	-	-	-	-	photol. CH_3COOCD_3	[1602]	941
$CH_3 + C_2H_4 \rightarrow n\text{-}C_3H_7$	403 - 503	-	11.10±0.07	0	6.84±0.14	photol. $(CH_3)_2CO$	[509]	768
	417 - 559	-	11.25	0	7.0±1.5	"	[1044]	"
	400 - 560	-	11.23±0.20	0	7.01±0.41	-	-	942

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + C_2H_4 \rightarrow$ iso-C_3H_7	300 - 723	-	-	-	-	-	[1524]	943
$CH_3 + C_2H_4 \rightarrow C_3H_7$	279 - 368	-	-	-	-	pyr. acetyl peroxide	[527]	944
	353 - 453	-	11.93_4	0	7.9	photol. $(CH_3CO)_2$	[422]	839
	397 - 432	-	12.09	0	8.66	pyr. (tert-$C_4H_9O)_2$	[226]	768
	670 - 705	-	11.52	0	7.82	"	[792]	"
	350 - 705	-	11.22±0.23	0	6.80_5± ±0.47	-	-	945
	"	-	11.31±0.10	0	7.10_5± ±0.21	-	-	946
$CH_3 + C_2H_5 \rightarrow C_3H_8$	299 - 448	-	-	-	-	photol. $CH_3COC_2H_5$	[58]	947
	352 - 403	-	-	-	-	"	"	948,949
	373	13.62±0.05	-	-	-	photol. $(CH_3)_2CO$	[749]	919,950, 951
$CH_3 + C_3H_6 \rightarrow C_4H_9$	279 - 368	-	-	-	-	pyr. acetyl peroxide	[527]	952
	353 - 453	-	11.52	0	7.4	photol. $(CH_3CO)_2$	[422]	839
	381 - 441	-	11.88	0	8.8	pyr. (tert-$C_4H_9O)_2$	[1127]	768
	417 - 559	-	10.78	0	6.0±1.0	photol. $(CH_3)_2CO$	[1044]	768,953
	350 - 560	-	11.40±0.53	0	7.58±1.03	-	-	954
CH_3 + iso-$C_3H_7 \rightarrow$ iso-C_4H_{10}	713 - 814	-	13.3	0	-0.6	pyr., from k_ and K	[954]	
CH_3 + n-$C_4H_9 \rightarrow$ n-C_5H_{12}	348 - 457	-	13.99	0	0	photol. $(CH_3)_2CO$	[1497]	955
$CH_3 + C_4H_8$-1 $\rightarrow C_5H_{11}$	353 - 453	-	11.3	0	7.2	photol. $(CH_3CO)_2$	[422]	839
	"	-	11.07	0	7.02	"	"	956
CH_3 + cis-C_4H_8-2 $\rightarrow C_5H_{11}$	353 - 453	-	10.95	0	7.5	photol. $(CH_3CO)_2$	[422]	839
	"	-	10.72	0	7.32	"	"	956
CH_3 + trans-C_4H_8-2 $\rightarrow C_5H_{11}$	353 - 453	-	11.46	0	8.1	photol. $(CH_3CO)_2$	[422]	839
	"	-	11.23	0	7.92	"	"	956
CH_3 + sec-$C_4H_9 \rightarrow$ iso-C_5H_{12} ?	381 - 412	-	-	-	-	pyr. (tert-$C_4H_9O)_2$	[1127]	957
CH_3 + iso-$C_4H_8 \rightarrow C_5H_{11}$	279 - 368	-	-	-	-	pyr. acetyl peroxide	[527]	958

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	353 - 453	-	11.46	0	6.9	photol. $(CH_3CO)_2$	[422]	839
	"	-	11.23	0	6.72	"	"	956
CH_3 + trimethylethylene → C_6H_{13}	403 and 453	-	~ 10.48	0	~6.1	photol. $(CH_3CO)_2$	[422]	839
$CH_3 + (CH_3)_2CC(CH_3)_2 \rightarrow C_7H_{15}$	403 and 453	-	~10.3	0	~ 6.8	photol. $(CH_3CO)_2$	[422]	839
CH_3 + butadiene → C_5H_9	279 - 368	-	-	-	-	pyr. acetyl peroxide	[527]	959
	403 and 453	-	11.2	0	4.1	photol. $(CH_3CO)_2$	[422]	839
	"	-	10.97	0	3.92	"	"	956
	417 - 559	-	~ 9.75	0	~ 2.5	photol. $(CH_3)_2CO$	1044	768
CH_3 + isoprene → C_6H_{11}	279 - 368	-	-	-	-	pyr. acetyl peroxide	[527]	960
$CH_3 + C_2H_2 \rightarrow C_3H_5$	371 - 479	-	11.4	0	7.7	photol. CH_3CHO	[600]	
	417 - 559	-	11.0	0	5.5	photol. $(CH_3)_2CO$	1044	961
$CH_3 + C_4H_6 \rightarrow C_5H_9$	437 - 509	-	-	0	2.5	photol.	[1044]	768
$CH_3 + C_6H_5CH_2 \rightarrow C_6H_5C_2H_5$	529 - 799	-	11.20	0	0.2	pyr.	[953]	
$CH_3 + C_6H_5CHCH_2 \rightarrow C_6H_5C_3H_6$	279 - 368	-	-	-	-	pyr. acetyl peroxide	[527]	962
$CH_3 + C_6H_5CHCHCH_3$ (a-methylstyrene) → $C_6H_5C_4H_8$	279 - 368	-	-	-	-	pyr. acetyl peroxide	[527]	963
$CH_3 + CH_3O \rightarrow CH_3OCH_3$	302	-	-	-	-	photol. CH_3COOCH_3	[1601]	964
	314 - 365	-	14.18	0	1.65	photol. $CH_3OCOOCH_3$	[1649]	965
	385 - 450	13.5	-	-	-	-	[158]	854
$CH_3 + CD_3O \rightarrow CH_3OCD_3$	303 and 363	-	-	-	-	photol. CH_3COOCD_3	[1602]	856
	418 - 623	-	-	-	-	"	[1603]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3 + HCO \rightarrow CH_3CHO$	303 - 376	-	12.58	0	0	photol. $HCOOCH_3$	[1650]	966
$CH_3 + CH_3CO \rightarrow (CH_3)_2CO$	300	-	-	-	-	photol. $(CH_3CO)_2$	[56]	967
	302	-	-	-	-	photol. CH_3COOCH_3	[1601]	968
$CH_3 + CH_3CO \rightarrow (CH_3)_2CO$	303 and 363	-	-	-	-	photol. methyl acetate	[1602]	969
$CH_3 + CH_3CHO \rightarrow$ $\rightarrow$ iso-C_3H_7O	523	-	8.3	0	11.5	therm.	[120]	240
$CH_3 + CH_2COCH_3 \rightarrow$ $\rightarrow C_2H_5COCH_3$	378 - 557	-	-	-	-	photol. $(CH_3)_2CO$	[1042]	970
$CH_3 + C_6H_5CH_2 \rightarrow$ $\rightarrow C_6H_5C_2H_5$	529 - 799	-	11.17	-	0.2	photol. $(CH_3)_2CO$	[953]	768
$CH_3 + C_6H_5O \rightarrow$ $\rightarrow C_6H_5OCH_3$ и $CH_3C_6H_4OH$	445 - 547	-	-	-	-	pyr. (tert-$C_4H_9O)_2$	[1159]	
$CH_3 + C_6H_5OCH_2 \rightarrow$ $\rightarrow C_6H_5OC_2H_5$	487	~13.05	-	-	-	pyr. (tert-$C_4H_9O)_2$	[1156]	
$CH_3 + CF_3 \rightarrow CH_3CF_3$	296 - 521	-	-	-	-	photol. $(CH_3)_2CO$+ $(CF_3)_2CO$	[9,627]	971
	302 - 442	-	-	-	-	"	[1264]	972
$CH_3 + C_2F_5 \rightarrow CH_3C_2F_5$	423 - 545	-	-	-	-	photol. $(C_2F_5)_2CO$	[1259]	973
$CH_3 + C_2H_3Cl \rightarrow$ $\rightarrow CH_3CH_2CHCl$	395 - 432	-	12.89	0	9.5±0.3	pyr.	[738]	
	397 - 431	-	12.75	0	9.05	pyr. (tert-$C_4H_9O)_2$	[792]	
$CH_3 + CF_3COCF_3 \rightarrow$ $\rightarrow CH_3CF_3COCF_3$	296 - 521	-	11.67±0.50	0	7 ± 1	photol. $(CH_3)_2CO$+ $(CF_3)_2CO$	[627]	768
$CH_3 + CH_3NNCH_3 \rightarrow$ $\rightarrow (CH_3)_2NNCH_3$	297 - 449	-	-	0	6.4	photol. $(CH_3N)_2$	[865]	
	297 - 451	-	10.7	0	6.3	"	"	
	298 - 437	-	10.80±0.32	0	5,8±0.6	photol. $(CH_3N)_2$	[644]	768
	348 - 390	-	11.25_5	0	7,1	"	[912]	"
	396 and 434	-	-	-	-	photo-ox. $(CH_3N)_2$	[791]	974
	300 - 450	-	10.70_5±0.42	0	6.04±0.71	-	-	975

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CD_3 + H_2 = CHD_3 + H$	405-571	-	11.78	0	10.2±0.2	photol. $(CD_3)_2CO$	[1041,1039, 1040]	837
	424-570	-	12.12	0	11.1	"	[1597]	837,976,769
	471	~7.10	-	-	-	"	[755]	837
	400-570	-	11.87±0.22	0	10.43± ±0.47	-	-	977
$CD_3 + HD = CHD_3 + D$	410-572	-	11.54	0	10.7	photol. $(CD_3)_2CO$	[1597]	837,769
$CD_3 + HD = CD_4 + H$	410-572	-	11.31	0	10.7	photol. $(CD_3)_2CO$	[1597]	837,769
$CD_3 + D_2 = CD_4 + D$	412-567	-	11.55	0	10.9±0.3	photol. $(CD_3)_2CO$	[1040,1041, 1039]	837,769,772
	418-698	-	11.42	0	11.79	fl.	[650]	978
$CD_3 + NH_3 = CHD_3 + NH_2$	458-612	-	11.17	0	11.19	photol. $(CD_3)_2CO$	[1529,1524]	979
$CD_3 + CH_4 = CHD_3 + CH_3$	578	~6.40	-	-	-	photol. $(CD_3)_2CO$	[1580]	979
	598	6.60	-	-	-	"	[1600]	"
	628-708	-	11.46	0	13.9	fl.	[650]	978,979
	623-798	-	-	0	14.0	photol. and pyr. $(CD_3)_2CO$	[1087]	
	"	-	11.46	0	14.23	pyr. $(CD_3)_2CO$	"	979,794,980
$CD_3 + CD_4 = CD_4 + CD_3$	478-623	-	12.95	0	18.4	photol. $(CD_3)_2CO$	[409]	837, R
	"	-	12.61	0	17.8±0.5	"	"	981
$CD_3 + C_2H_6 = CHD_3 +$ $+ C_2H_5$	378-578	-	11.45	0	10.4±0.2	photol.	[1526, 1530]	837
	389-567	-	11.31	0	10.4	$(CD_3)_2CO$	[1525, 1524]	982
	"	-	11.68	0	11.59	"	"	837, 979
	435-614	-	11.71	0	11.48	"	[1600]	979
	519-801	-	11.86±0.20	0	11.7±0.46	photol. and pyr. $(CD_3)_2CO$	[1088]	"
	528-798	-	11.86	0	11.4	photol. $(CD_3)_2CO$	[650]	"
	390-800	-	12.00±0.14	0	12.09±0.33	"	-	983
$CD_3 + CH_3CD_3 = CHD_3 +$ $+ CH_2CD_3$	589-737	-	10.84	1/2	11.6	photol. $(CD_3)_2CO$	[1084]	984
	"	-	10.34	1/2	11.4	"	[1084, 824]	985
	"	-	11.37	0	11.33	"	[1084]	979, 986

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CD_3 + CH_3CD_3 = CD_4 + CH_3CD_2$	539–737	-	10.48	1/2	13.5	photol. $(CD_3)_2CO$	[1084]	984
	"	-	11.56	0	13.28	"	"	986, R
$CD_3 + C_2D_6 = CD_4 + C_2D_5$	523–783	-	11.08	0	14.7	fl.	[650]	978,979
	550–760	-	10.63	1/2	13.0	photol. $(CD_3)_2CO$	[1084]	984,987
	"	-	11.66	0	12.73	"	"	986, R
$CD_3 + CD_2CH_2CH_3 = CHD_3 + CD_2CHCH_3$	299	-	-	-	-	photol. $CD_3COCD_2CH_2CH_3$	[52]	988
$CD_3 + (CH_3)_2CH_2 = CHD_3 + (CH_3)_2CH$	573–725	-	10.28_5	1/2	9.7	photol. $(CD_3)_2CO$	[824]	984,989
	"	-	11.52	0	10.09	"	"	989,979
$CD_3 + (CH_3)_2CD_2 = CD_4 + (CH_3)_2CD$	555–725	-	10.27	1/2	11.1	photol. $(CD_3)_2CO$	[823,824]	984
	"	-	11.50	0	11.49	"	[823,824]	979
$CD_3 + (CH_3)_2CD_2 = CHD_3 + CH_2CD_2CH_3$	555–725	-	10.5	1/2	11.1	photol. $(CD_3)_2CO$	[823,824]	984
	"	-	11.73	0	11.49	"	[823,824]	979
$CD_3 + n\text{-}C_4H_{10} = CHD_3 + CH_2CH_2CH_2CH_3$	629–723	-	10.51	1/2	11.1	pyr. $(CD_3)_2CO$	[1089]	984,990
	"	-	11.75	0	11.49	"	"	979
$CD_3 + n\text{-}C_4H_{10} = CHD_3 + CH_3CHCH_2CH_3$	523–722	-	10.34	1/2	9.1	pyr. $(CD_3)_2CO$	[1089,824]	991
	523–722	-	11.58	0	9.49	"	"	979
	523–723	-	11.57	0	9.69	fl.	[650]	978
	629–723	-	10.34	1/2	9.3	pyr. $(CD_3)_2CO$	[1089]	984
	"	-	11.58	0	9.69	"	"	979
$CD_3 + CH_3CD_2CD_2CH_3 = CD_3H + CH_2CD_2CD_2CH_3$	623–723	-	11.75	0	11.29	fl.	[650]	978
	629–723	-	10.51	1/2	11.1	pyr. $(CD_3)_2CO$	[1089,824]	984
	"	-	11.75	0	11.49	"	"	979

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CD_3 + CH_3CD_2CD_2CH_3 =$	628–728	–	11.78	0	11.29	fl.	[650]	978
$= CD_4 + CH_3CDCD_2CH_3$	629–728	–	10.54	1/2	11.1	photol. $(CD_3)_2CO$	1089, 824	984
	"	–	11.78	0	11.49	"	"	979
$CD_3 + (CH_3)_3CH = CHD_3 + (CH_3)_3C$	578–725	–	9.84_4	1/2	7.6	photol. $(CD_3)_2CO$	[824]	984
	"	–	11.08	0	8.0	"	"	979
$CD_3 + (CH_3)_3CD = CD_4 + (CH_3)_3C$	578–725	–	9.94_4	1/2	9.2	photol. $(CD_3)_2CO$	[824]	984
	"	–	11.18	0	9.6	"	"	979
$CD_3 + (CH_3)_3CD = CHD_3 + CH_2CD(CH_3)_2$	578–725	–	10.64	1/2	11.1	photol. $(CD_3)_2CO$	[824]	984
	"	–	11.88	0	11.49	"	"	979
$CD_3 + (CH_3)_4C = CHD_3 + CH_2(CH_3)_3C$	432.5–481	–	11.67	0	11.19	photol. $(CD_3)_2CO$	[1525, 1524]	979
$CD_3 +$ 2,3-dimethylbutane $= CHD_3 + C_6H_{13}$	439–566	–	11.32	0	7.8±0.4	photol. $(CD_3)_2CO$	[1525, 1524]	354
	"	–	11.67	0	8.99	"	"	838, R
$CD_3 + C_2(CH_3)_6 = CD_3H + (CH_3)_3CC(CH_3)_2CH_2$	435–605	–	11.67	0	10.69	photol. $(CD_3)_2CO$	[1525, 1524]	979
$CD_3 + C_2H_4 = CHD_3 + C_2H_3$	461–613	–	11.73	0	11.19	photol. $(CD_3)_2CO$	[1528]	979
$CD_3 + C_3H_6 = CHD_3 + C_3H_5$	436–577	–	11.25	0	8.89	photol. $(CD_3)_2CO$	[1528]	979
$CD_3 + C_4H_8$-1 $= CHD_3 + C_4H_7$	462–618	–	11.65	0	8.79	photol. $(CD_3)_2CO$	[1528]	979
$CD_3 +$ cis-C_4H_8-2 $= CHD_3 + C_4H_7$	461–615	–	11.65	0	8.89	photol. $(CD_3)_2CO$	[1528, 1524]	979
$CD_3 +$ 2-methylpropene $= CHD_3 + C_4H_7$	441–577	–	11.38	0	8.49	photol. $(CD_3)_2CO$	[1528]	979
$CD_3 + C_5H_{10}$-1 $= CHD_3 + C_5H_9$	461–619	–	11.67	0	8.79	photol. $(CD_3)_2CO$	[1528]	979

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
CD_3 + 3-methyl-1-butene = $CHD_3 + C_5H_9$	462–619	–	11.76	0	8.59	photol. $(CD_3)_2CO$	[1528]	979
CD_3 + 2,3-dimethyl-butene-2 = $CHD_3 + C_6H_{11}$	461–614	–	12.06	0	8.99	photol. $(CD_3)_2CO$	[1528]	979
$CD_3 + C_2H_2 = CHD_3 + C_2H$	478–778	–	–	0	13.9	photol. $(CD_3)_2CO$	[487]	847
CD_3 + 2-butyne = $CHD_3 + C_4H_5$	486–619	–	11.97	0	9.79	photol. $(CD_3)_2CO$	[1529, 1524]	979
CD_3 + 1-butyne = $CHD_3 + C_4H_5$	456–620	–	12.27	0	10.29	photol. $(CD_3)_2CO$	[1529, 1524]	979
CD_3 + cyclo–C_3H_6 = CHD_3 + cyclo–C_3H_5	412–565	–	11.37	0	11.49	photol. $(CD_3)_2CO$	[1529, 1524]	979
	521–677	–	10.66	1/2	12.9	"	[1090]	984
	521–677	–	11.90	0	13.29	photol. $(CD_3)_2CO$	[1090]	979
	528–678	–	11.89	0	13.0	fl.	[650]	"
CD_3 + cyclo–C_4H_8 = CHD_3 + cyclo–C_4H_7	427–580	–	11.77	0	10.49	photol. $(CD_3)_2CO$	[1529, 1524]	979
	456–698	–	10.66	1/2	10.18±0.15	"	[649]	984
	"	–	11.90	0	10.52	"	"	979
CD_3 + cyclo–C_5H_9 = CHD_3 + cyclopentene	405–491	–	–	–	–	photol. $(CD_3N)_2$	[647]	992
CD_3 + cyclo–C_5H_{10} = CHD_3 + cyclo–C_5H_9	485–800	–	11.70	0	9.89	photol. $(CD_3N)_2$	[647]	979
	455–569	–	11.77	0	9.49	photol. $(CD_3)_2CO$	[1529, 1524]	979
	528–678	–	12.0	0	9.8	fl.	[650]	"
	528–675	–	12.00	0	9.49	photol. $(CD_3)_2CO$	[1090]	"
	485–800	–	11.96±0.88	0	9.49±1.00	–	–	998

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CD_3 + C_6H_6 = CHD_3 + C_6H_5$	456–600	-	10.77	0	10.39	photol. $(CD_3)_2CO$	[1529,1524]	979
$CD_3 + C_6H_5CH_3 = CHD_3 + C_6H_5CH_2$	393–607	-	11.37	0	9.49	photol. $(CD_3)_2CO$	[1524,1529]	979, 994
$CD_3 + CD_3O = CD_4 + DCDO$	418–623	-	-	0	0	photol. CH_3COOCD_3	[1603]	995
$CD_3 + CH_3OH = CD_3H + CH_2OH$	403–523	-	10.50	0	8.14	photol. $(CD_3)_2CO$	[1398]	996, 837
$CD_3 + CH_3OH = CHD_3 + CH_3O$	398–518	-	10.58	0	8.98	photol. $(CD_3)_2CO$	[1398]	837, 997
$CD_3 + CH_3OH = CD_3H + [COH_3]$	403–523	-	10.80±0.05	0	8.40±0.08	photol. $(CD_3)_2CO$	[1398]	
$CD_3 + CD_3OH = CD_4 + CD_2OH$	398–523	-	10.30±0.06	0	9.29±0.10	photol. $(CD_3)_2CO$	[1398]	837
$CD_3 + CD_3OH = CHD_3 + CD_3O$	398–523	-	10.58±0.03	0	8.98±0.06	photol. $(CD_3)_2CO$	[1398]	837
$CD_3 + CH_3OD = CD_3H + CH_2OD$	413–523	-	11.29±0.07	0	10.05± ±0.14	photol. $(CD_3)_2CO$	[660b, 756a]	
$CD_3 + CH_3OD = CD_4 + CH_3O$	413–523	-	~10.5	0	~11.3	photol. $(CD_3)_2CO$	[660b]	
$CD_3 + C_2H_5OH = CHD_3 + [C_2OH_5]$	462–614	-	11.87	0	9.89	photol. $(CD_3)_2CO$	[1529, 1524]	979
$CD_3 + C_2H_5OD = CHD_3 + C_2H_4OD$	403–523	-	11.64±0.07	0	9.71± ±0.16	photol.	[660a, 756a]	998
$CD_3 + C_2H_5OD = CD_4 + C_2H_5O$	403–523	-	10.79±0.03	0	10.15± ±0.20	photol.	[660a]	998

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
CD_3 + iso-C_3H_7OH = = CHD_3 + C_3H_6OH	487-620	-	11.37	0	8.49	photol. $(CD_3)_2CO$	[1529, 1524]	979
CD_3 + $(CH_3)_2CHOD$ = = CD_3H + [$(CH_3)_2COD$ + + CH_2CH_3CHOD]	413-523	-	11.17±0.09	0	7.91±0.19	photol. $(CD_3)_2CO$	[660b, 756a]	
CD_3 + $(CH_3)_2CHOD$ = = CD_4 + $(CH_3)_2CHO$	413-523	-	9.13±0.14	0	6.02±0.29	photol. $(CD_3)_2CO$	[660b]	
CD_3 + CD_3SH = CD_3H + + CD_3S	403-473	-	10.42	0	3.1	photol. $(CD_3)_2CO$	[680]	837
CD_3 + (iso-$C_3H_7)_2O$ = = CHD_3 + iso- $C_3H_7OC_3H_6$	452-612	-	11.47	0	8.49	photol. $(CD_3)_2CO$	[1529, 1524]	979
CD_3 + CH_3COCH_3 = = CD_3COCH_3 + CH_3	823	<7,14	-	-		pyr. CD_3CDO	[1315]	999
CD_3 + CH_3COCH_3 = CHD_3 + + CH_2COCH_3	418-526	-	11.70±0.23	0	9.85±0.50	photol. $(CH_3)_2CO$ + +$(CI_3)_2CO$	[1085, 1087, 1086, 1088]	979
CD_3 + CD_2HCOCD_3 = CHD_3 + + CD_2COCD_3	403-473	-	9.99	0	9.48	photol. $(CD_3)_2CO$	[680]	837
	403-523	-	10.74	0	9.95 ± 0.15	photol. CD_3COCHD_2	[1398]	1000
CD_3 + CD_3COCD_3 = CD_4 + + CD_2COCD_3	373-573	-	-	0	10.3	photol.	[1526]	
	403-473	-	11.69 ± 0.01	0	11.29 ± 0.03	photol. $(CD_3)_2CO$	[680]	837
	403-523	-	11.78±0.03	0	11.44± ±0.05	"	[1398]	"
	"	-	11.62±0.05	0	11.54± ±0.10	"	[660a]	998
	423-523	-	-	0	11.51	photol.	[1086]	1001
	403-563	-	11.50	0	10.6±0.3	"	[1041]	837
	"	-	11.51	0	10.6±0.3	photol. $(CD_3)_2CO$	[1041, 1039]	1002, 794, 837
	403-693	-	11.88	0	11.6±0.3	"	[1597]	837, 794
	407-599	-	11.49	0	10.57	photol.	[1039]	837

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	411-565	-	11.41	0	10.3	photol. $(CD_3)_2CO$	[1527]	837, 794
	"	-	10.54$_3$	1/2	11.1	-	[824]	1003
	471	6.57	-	-	-	photol. $(CD_3)_2CO$	[181]	837
	478-625	-	11.86	0	11.4	"	[428, 409]	1004
	739-798	-	-	0	11.3	photol. $(CH_3)_2CO$+ $(CD_3)_2CO$	[1085]	1005
	400-500	-	11.78±0.19	0	11.49± ±0.42	-	-	1006
$CD_3 + CH_3NH_2 = CHD_3 +$ $+ CH_2NH_2$	456-617	-	11.67	0	9.59	photol. $(CD_3)_2CO$	[1529, 1524]	979
$CD_3 + (CH_3)_2NH = CHD_3 +$ $+ [C_2NH_6]$	457-614	-	11.67	0	8.39	photol. $(CD_3)_2CO$	[1529, 1524]	979
$CD_3 + (CH_3)_3N = CHD_3 +$ $+ CH_2(CH_3)_2N$	466-575	-	12.17	0	9.99	photol. $(CD_3)_2CO$	[1529, 1524]	979
$CD_3 + CH_3F = CD_3H +$ $+ CH_2F$	466-604	-	10.04±0.03	1/2	11.1	photol. $(CD_3)_2CO$	[1262]	984
	"	-	11.28	0	11.49	"	"	979
$CD_3 + CH_2F_2 = CHD_3 +$ $+ CHF_2$	395-574	-	9.80	1/2	9.9	photol. $(CD_3)_2CO$	[1262]	984
	"	-	11.04	0	10.3	"	"	979
$CD_3 + CHF_3 = CHD_3 + CF_3$	415-566	-	8.67	1/2	9.8	photol. $(CD_3)_2CO$	[1272]	984
	"	-	9.91	0	9.7	"	"	979
	417-582	-	8.88	1/2	9.9	"	[1278]	984
	"	-	10.07	0	10.3	"	"	979
$CD_3 + C_2HF_5 = CHD_3 +$ $+ C_2F_5$	408-591	-	9.62	1/2	9.16	photol. $(CD_3)_2CO$	[1278]	984
	"	-	10.86	0	9.55	"	"	979
$CD_3 + C_3HF_7 = CHD_3 +$ $+ C_3F_7$	402-596	-	9.48	1/2	8.83	photol. $(CD_3)_2CO$	[1278]	984
	"	-	10.67	0	9.22	"	"	979
$CD_3 + CH_3CN = CHD_3 +$ $+ CH_2CN$	378-568	-	-	0	10.0 ± ± 0.5	photol. $(CD_3)_2CO$	[1599]	
	406-568	-	10.54	1/2	10.0	"	"	984
	"	-	11.78	0	10.4	"	"	979

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CD_3 + C_2H_5CN = CHD_3 + C_2H_4CN$	406–570	-	-	0	8.5±0.5	photol. $(CD_3)_2CO$	[1599]	
	"	-	10.43	1/2	8.3	"	"	984
	"	-	11.67	0	8.7	"	"	979
$CD_3 + CD_3 \rightarrow C_2D_6$	438	13.58	-	-	-	photol. $(CD_3)_2CO$	[935, 1401]	938
	438 and 468	13.51	-	-	-	"	[935]	"
$CD_3 + CD_2CH_2CH_3 \rightarrow CD_3CD_2CH_2CH_3$	301 and 423	-	-	-	-	photol. and pyr. $CD_3COC_2H_5$	[1091]	1007
$CD_3 + CD_3O \rightarrow CD_3OCD_3$	303 and 363	-	-	-	-	photol. CH_3COOCD_3	[1602]	
	418–623	-	-	-	-	"	[1608]	
$CD_3 + CD_3CO \rightarrow CD_3COCD_3$	299	-	-	-	-	photol. $CD_3COCD_2CH_2CH_3$	[52]	1008
$CD_3 + CD_3NO \rightarrow (CD_3)_2NO$	298	>10.59	-	-	-	photol. $(CD_3N)_2$	[1059]	1009
	"	10.12	-	-	-	"	[1058]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_2H_5 + H_2 = C_2H_6 + H$	327–560	–	–	0	11.5±1	photol. $(C_2H_5)_2CO$	[1609]	1010, 1011
	473–593	–	–	0	$10.5 \leq E \leq 11.1$	Hg photo.	[994]	
	513–593	–	12.57	0	13.7	"	[1312]	1012
	548	–	–	0	>15	pyr. $Pb(C_2H_5)_4$	[988]	
	828	8.60	–	–	–	therm.	[712]	1013
	473–823	–	11.47	0	10.8	–	–	1014
$C_2H_5 + D_2 = C_2H_5D + D$	298–398	–	–	0	13.5±1.0	β radiol.	[986]	
	327–560	–	11.9	0	13.3±0.5	photol. $(C_2H_5)_2CO$	[1609]	1015
$C_2H_5 + Cl_2 = C_2H_5Cl + Cl$	253–423	–	13.1	0	1.0	photochem.	[637, 346, 499]	
$C_2H_5 + Br_2 = C_2H_5Br + Br$	308–363	–	–	–	–	photochem.	[27]	1016, 1017
$C_2H_5 + I_2 = C_2H_5I + I$	298	–	–	–	–	photol. C_2H_5I	[354]	1018
	523–573	–	–	–	–	therm.	[1448, 1192]	1019
	536–576	–	12.50	0	0.2	"	[734]	1020
$C_2H_5 + HCl = C_2H_6 + Cl$	–	–	12.3	0	8.1	photo-Cl_2	[346, 499]	
$C_2H_5 + HBr = C_2H_6 + Br$	308–363	–	–	–	–	photochem.	[27]	1016, 1017
$C_2H_5 + HI = C_2H_6 + I$	233–417	–	–	0	1.5–2.0	photol. HI	[1719]	
	523–573	–	–	–	–	therm.	[1448, 1192]	1019
	"	–	12.11	–	–	–	[154]	1021
	537–577	–	11.92	0	1.1	therm.	[734]	1022
$C_2H_5 + C_2H_4 = C_2H_6 + C_2H_3$	773–873	–	11.5±1.0	0	13.0±3.0	pyr. C_2H_4	[212]	1027
	798–924	–	12.8±0.4	0	19.4±1.4	"	[711]	1023
	823	7.55_5	–	–	–	therm.	[712]	1013
$C_2H_5 + C_2H_5 = C_2H_6 + C_2H_4$	294–303	–	–	–	–	photol. C_2H_5CHO	[175]	1024
	room	–	–	–	–	photol.	[1483]	1025
	"	–	–	–	–	Hg photo.	[1312]	1028

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	room?	-	-	-	-	photochem.	[188]	1026
	298–400	-	~13.00	0	0	photol. $(C_2H_5)_2CO$	[976]	820
	299–451	-	-	-	-	photol. $(C_2H_5N)_2$	[54]	1029
	300–391	13.08	-	-	-	"	[330]	1030, 820
	301–348	-	13.13	0	0	photol. $(C_2H_5)_2CO$	[645]	820
	315 and 473	-	-	0	≥1.2	Hg photo.	[994]	1031
	323–423	-	14.0	0	2.55±0.65	photol. $(C_2H_5)_2CO$	[1403]	1032
	323–488	-	-	-	-	"	[838]	1033
	323–588	-	13.18	0	0	photol. C_2H_5CHO	[921]	820
	329 and 393	-	-	0	4.8	photol. $C_2H_5COC_2H_5$	[485]	1034
	348–443	-	13.15	0	0	"	[1495]	820
	348–473	-	13.22	0	0.8±0.2	photol. $Hg(C_2H_5)_2$	[820]	1034, 1035, 1036
	352–507	-	-	-	-	photol. $CH_3COC_2H_5$	[58]	1037
	373–523	-	-	-	-	photol. $(C_2H_5)_2CO$	[228]	1038
	388–423	-	13.11	0	0	photol. $(C_2H_5)_2CO$	[692]	820, 1039
	423	12.80	-	-	-	photol. $Hg(C_2H_5)_2$	[820]	
	532–593	-	-	-	-	Hg photo.	[1312]	1042
	593–643	-	-	-	-	pyr. $Hg(C_2H_5)_2$	[653]	1040
	623	-	-	-	-	"	[653]	1041
$C_2H_5 + C_2H_5 = C_2H_6 + C_2H_4$ and $\rightarrow C_4H_{10}$	349–575	13.33	-	-	-	dis. , H_2	[1671]	
	423	13.35	-	-	-	photol. $Hg(C_2H_5)_2$	[820]	
$C_2H_5 + n\text{-}C_3H_7 = C_2H_6 + C_3H_6$	room	-	-	-	-	photol.	[1483]	1043
	298	-	-	-	-	Hg photo.	[798]	1044
	369–402	-	-	-	-	photol. acetone-azopropane mixt.	[692]	1045
$C_2H_5 + n\text{-}C_3H_7 = C_3H_8 + C_2H_4$	room	-	-	-	-	photol.	[1483]	1046

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
C_2H_5 + iso-C_3H_7 =	room	-	-	-	-	photol.	[1482]	1047
= C_2H_6 + C_3H_6	room?	-	-	-	-	photochem.	[188]	1048
	298	-	-	-	-	Hg photo.	[796]	1052
	307–417	-	-	-	-	photochem.	[1494]	1049
	321–385	-	-	-	-	photol.	[599]	1053
C_2H_5 + iso-C_3H_7 =	room	-	-	-	-	photol.	[1483]	1050
= C_3H_8 + C_2H_4	room?	-	-	-	-	photochem.	[188]	1051
	321–385	-	-	-	-	photol.	[599]	1054
C_2H_5 + iso-C_4H_9 =	273	-	-	-	-	Hg photo.	[798]	1055
= C_2H_6 + C_4H_8	293	-	-	-	-	photol.	[1484]	1056
C_2H_5 + iso-C_4H_9 = = C_2H_4 + C_4H_{10}	293	-	-	-	-	photol.	[1484]	1056
C_2H_5 + sec-C_4H_9 = = C_2H_6 + C_4H_8	298	-	-	-	-	Hg photo.	[796]	1060
C_2H_5 + tert-C_4H_9 =	293	-	-	-	-	photol.	[1484]	1057
= C_2H_6 + C_4H_8	room?	-	-	-	-	photochem.	[188]	1051
	298	-	-	-	-	Hg photo.	[796]	1061
	346–354	-	-	-	-	photol.	[599]	1062
C_2H_5 + tert-C_4H_9 =	293	-	-	-	-	photol.	[1484]	1058
= C_4H_{10} + C_2H_4	room?	-	-	-	-	photochem.	[188]	1059
	346–354	-	-	-	-	photol.	[599]	1063
C_2H_5 + n-C_5H_{11} = = C_2H_6 + C_5H_{10}	273	-	-	-	-	Hg photo.	[798]	1065
C_2H_5 + sec-C_5H_{11} = = C_2H_6 + C_5H_{10}	298	-	-	-	-	Hg photo.	[796]	1064
C_2H_5 + tert-C_5H_{11} = = C_2H_6 + C_5H_{10}	298	-	-	-	-	Hg photo.	[796]	1066
C_2H_5 + sec-C_6H_{13} = = C_2H_6 + C_6H_{12}	298	-	-	-	-	Hg photo.	[796]	1067

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
C_2H_5 + 1,2,2-trimethyl-propyl = C_2H_6 + C_6H_{12}	298	-	-	-	-	Hg photo.	[796]	1068
C_2H_5 + 1,1-dimethyl-butyl = C_2H_6 + C_6H_{12}	298	-	-	-	-	Hg photo.	[796]	1069
C_2H_5 + 1,1,2-trimethyl-propyl = C_2H_6 + C_6H_{12}	298	-	-	-	-	Hg photo.	[796]	1070
C_2H_5 + 1-methyl-1-ethyl-propyl = C_2H_6 + C_6H_{12}	298	-	-	-	-	Hg photo.	[796]	1071
C_2H_5 + n-C_7H_{16} = = C_2H_6 + C_7H_{15}	398–473	-	11.99±0.2	0	10.6±0.4	photol. $(C_2H_5)_2CO$	[838]	820
C_2H_5 + 1-heptene = = C_2H_6 + C_7H_{13}	360–480	-	11.49±0.3	0	8.3±0.5	photol. $(C_2H_5)_2CO$	[838]	820
C_2H_5 + 1-octene = = C_2H_6 + C_8H_{15}	360–460	-	11.49±0.3	0	8.3±0.2	photol. $(C_2H_5)_2CO$	[838]	820
C_2H_5 + trans-4-octene = = C_2H_6 + C_8H_{15}	360–442	-	11.79±0.6	0	8.7±1.0	photol. $(C_2H_5)_2CO$	[838]	820
C_2H_5 + 1-heptyne = = C_2H_6 + C_7H_{11}	300–455	-	11.19±0.2	0	7.6±0.2	photol. $(C_2H_5)_2CO$	[838]	820
C_2H_5 + cyclopentyl = = C_2H_6 + C_5H_8	298	-	-	-	-	Hg photo.	[796]	1072
C_2H_5 + cyclohexadi-enyl-1,4 = C_2H_6 + C_6H_6	327–407	-	-	-	-	photol.	[843]	1073
C_2H_5 + cyclohexene = = C_2H_6 + cyclo-C_6H_9	300–523	-	11.79±0.3	0	8.2±0.5	photol. $(C_2H_5)_2CO$	[838]	820
C_2H_5 + cyclohexadiene-1,4 = C_2H_6 + C_6H_7	327–407	-	11.59±0.1	0	5.8±0.1	photol.	[843]	820
C_2H_5 + $C_2H_5OC_2H_5$ = = C_2H_6 + $CH_3CHOC_2H_5$	306–491	-	-	0	9	γ radiol.	[102]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_2H_5 + C_2H_5CHO = C_2H_6 + C_2H_5CO$	364–588	-	11.1	0	5.9	photol. C_2H_5CHO	[921]	820
	373–448	-	-	0	~8.1	"	[175]	1074
	407 and 429	-	11.77	0	7.6±1.0	pyr. $(tert\text{-}C_4H_9O)_2$	[1556]	820
	573–723	-	-	0	~6.5	photol. C_2H_5CHO	[1125]	
$C_2H_5 + CH_3COC_2H_5 = C_2H_6 + CH_3COCHCH_3$	352–507	-	11.22	0	8.0±0.1	photol. $CH_3COC_2H_5$	[58]	820
$C_2H_5 + C_2H_5COC_2H_5 = C_2H_6 + C_2H_4COC_2H_5$	298–498	-	11.17	0	7.3	photol. $C_2H_5COC_2H_5$	[976]	820
	301–348	-	11.45±0.41	0	8.06±0.64	"	[645]	820
	322–431	-	11.26	0	7.6±1	photol. $(C_2H_5N)_2$	[53]	820
	323–488	-	11.39±0.1	0	7.8±0.2	photol. $C_2H_5COC_2H_5$	[838]	820
	330 and 393	-	-	0	4.1	"	[485]	1034
	348–443	-	12.0	0	8.9	"	[1495]	820
	423–523	-	11.55±1.73	0	8.1±3.7	"	[228]	820
	300–520	-	11.45±0.35	0	7.92±0.20	-	-	1075
$C_2H_5 + HCOOC_2H_5 = C_2H_6 + COOC_2H_5$	348–443	-	10.9	0	7.8	photol. CH_3COCH_3	[1495]	1076
$C_2H_5 + CCl_3 = CHCl_3 + C_2H_4$	273–331	-	-	-	-	photol. CCl_4	[1337]	1077
$C_2H_5 + C_3F_7 = C_3HF_7 + C_2H_4$	353–529	-	-	-	-	photol. $C_3F_7COC_2H_5$	[1279]	1078
	360–469	-	-	-	-	"	[623]	1079
$C_2H_5 + C_3F_7COC_2H_5 = C_2H_6 + C_3F_7COC_2H_4$	353–635	-	11.19	0	7.2	photol. $C_3F_7COC_2H_5$	[1279]	820
$C_2H_5 + C_2H_5NNC_2H_5 = C_2H_6 + C_2H_4NNC_2H_5$	303–444	-	-	0	8.0±0.2	photol. $(C_2H_5N)_2$	[330]	1080
	347–451	-	11.15	0	7.5	"	[54]	820
$C_2H_5 + C_2H_5SO_2 = C_2H_6 + C_2H_4SO_2$	318–348	-	-	-	-	photol. $(C_2H_5)_2CO$	[645]	1081

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_2H_5 + Hg(C_2H_5)_2 = C_2H_6 + C_2H_4 + Hg + C_2H_5$	348-473	-	10.6	0	6.2	photol. $Hg(C_2H_5)_2$	[820, 922]	820
$C_2H_5 + NO = C_2H_5NO$	298	≥11.3	-	-	-	photol. C_2H_5I	[354]	1082
$C_2H_5 + NO \rightarrow C_2H_5NO$	506-540	≥10.5	-	-	-	pyr. $Pb(C_2H_5)_4$	[1258]	820
	903	9.2	-	-	-	est.	[177]	
$C_2H_5 + NO_2 \rightarrow C_2H_5NO_2$	593-713	-	-	-	-	therm.	[1611]	1083
$C_2H_5 + O_2 = C_2H_5O_2$	295	12.62	-	-	-	pulse photol.	[465]	1084
	room?	11.82	-	-	-	dis. , H_2	[1671]	320
	298	≥11	-	-	-	photol. C_2H_5I	[354]	
$C_2H_5 + O_2 \rightarrow C_2H_5O_2$	395	12.62	-	-	-	pulse photol.	[465]	
	308-423	-	14.5 ?	0	2.8 ?	photochem.	[860]	1085
	310	11.80	-	-	-	"	[637]	1086
	348-573	-	-	-	-	dis.	[1671]	
	375	10.05	-	-	-	photol. $C_2H_5COC_2H_5$	[553]	1087
$C_2H_5 + C_2H_4 \rightarrow n\text{-}C_4H_9$	332-396	-	10.02	0	5.5	Hg photo.	[1247]	820, 1088
	364-482	-	12.05	0	8.6	photol. C_2H_5CHO	[921]	820
	398-448	-	10.3	0	5.5	photol. $(C_2H_5N)_2$	[980]	820
	330-480	-	11.63±0.51	0	8.01±0.90	-	-	1089, 1090
$C_2H_5 + C_2H_5 = C_4H_{10}$	323-423	-	14.55	0	2 ± 1	photol. $C_2H_5COC_2H_5$	[1403]	1091, 1092
$C_2H_5 + C_2H_5 + H_2 = C_4H_{10} + H_2$	room	20.4	-	-	-	dis. , H_2	[1671]	
	348-575	-	20.04	0	0	dis. , flow	"	
$C_2H_5 + C_2H_5 \rightarrow C_4H_{10}$	323-423	13.4	-	-	-	photol. $(C_2H_5)_2CO$	[1403]	1093
	423	-	13.2	0	0	photol. $Hg(C_2H_5)_2$. int. ill.	[820]	512

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_2H_5 + n\text{-}C_3H_7 \rightarrow C_5H_{12}$	327–471	-	-	-	-	photol. $n\text{-}C_3H_7CHO$	[916]	1094
	338–402	-	-	-	-	photol. $(C_2H_5)_2CO + (n\text{-}C_3H_7N)_2$	[692]	1095
$C_2H_5 + iso\text{-}C_3H_7 \rightarrow C_5H_{12}$	303–443	-	-	-	-	photol. $C_2H_5COC_3H_7$	[1604]	1096
	323–473	-	-	-	-	photol. $iso\text{-}C_3H_7CHO$	[917]	1097
C_2H_5 + 1-hexene $\rightarrow C_8H_{17}$	338–435	-	10.89±0.3	0	6.8±0.5	photol. $(C_2H_5)_2CO$	[839]	820
C_2H_5 + methyl pentene-1 $\rightarrow C_8H_{17}$	363–476	-	11.39±0.20	0	7.3±0.3	photol.	[837]	820
C_2H_5 + 1-heptene $\rightarrow C_9H_{19}$	359–439	-	11.09±0.1	0	7.0±0.2	photol. $(C_2H_5)_2CO$	[839]	820
C_2H_5 + 2,3,3-trimethyl-1-butene $\rightarrow C_9H_{19}$	322–364	-	10.19±0.5	0	5.6±0.8	photol. $(C_2H_5)_2CO$	[839]	820
C_2H_5 + 1-octene $\rightarrow C_{10}H_{21}$	298–453	-	10.89±0.2	0	6.7±0.3	photol. $(C_2H_5)_2CO$	[839]	820
	363–476	-	11.39±0.1	0	7.6±0.2	"	[837]	820,1098, R
C_2H_5 + 2,4,4-trimethyl-1-pentene $\rightarrow C_{10}H_{21}$	309–364	-	10.59±0.6	0	5.7±0.9	photol. $(C_2H_5)_2CO$	[839]	820
C_2H_5 + trans-4-octene $\rightarrow C_{10}H_{21}$	359–439	-	~10.1	0	~7.0	photol. $(C_2H_5)_2CO$	[839]	
$C_2H_5 + C_2H_2 \rightarrow C_4H_7$	373–473	-	11.0	0	7.0	photol. C_2H_5CHO	[600,601]	820,1090
$C_2H_5 + C_6H_5CHCH_2 \rightarrow C_{10}H_{13}$	344–435	-	10.89±0.30	0	4.1±0.6	photol.	[836]	820
C_2H_5 + 1-heptyne $\rightarrow C_9H_{17}$	300–455	-	11.89±0.2	0	8.8±0.4	photol. $(C_2H_5)_2CO$	[839]	820

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
C_2H_5 + vinyl-n-butyl-ether $\rightarrow [C_8OH_{17}]$	308–473	-	10.69±0.30	0	6.1±0.5	photol.	[836]	820
C_2H_5 + pentanonyl $\rightarrow$ $\rightarrow C_2H_5COC_4H_9$	423–523	-	-	-	-	photol. $(C_2H_5)_2CO$	[228]	1100
C_2H_5 + vinyl acetate $\rightarrow$ $\rightarrow C_6O_2H_{11}$	307–417	-	11.19±0.30	0	6.9±0.5	photol.	[836]	820
$C_2H_5 + C_3F_7 \rightarrow$ $\rightarrow C_2H_5C_3F_7$	365 and 510	-	-	-	-	photol.	[1280]	1099
$C_2H_5 + (C_2H_5N)_2 \rightarrow$ $\rightarrow (C_2H_5)_2N_2C_2H_5$	300–391	-	-	0	6.0±0.3	photol. $(C_2H_5N)_2$	[330]	1080
$C_2H_5 + CH_2CHCN \rightarrow$ $\rightarrow C_4H_8CN$	313–488	-	11.09±0.3	0	3.4±0.4	photol.	[836]	820
$C_2H_5 + CH_2CCH_3CN \rightarrow$ $\rightarrow C_5H_{10}CN$	313–410	-	11.69±0.40	0	4.6±0.7	photol.	[837]	820
C_2H_5 + cis- crotononitrile $\rightarrow C_5H_{10}N$	328–431	-	10.49±0.3	0	5.0±0.5	photol.	[837]	820
C_2H_5 + trans- crotono-nitrile $\rightarrow C_5H_{10}CN$	328–435	-	10.79±0.3	0	5.2±0.6	photol.	[837]	820
$C_2H_5 + SO_2 \rightarrow C_2H_5SO_2$	301	8.74	-	-	-	photol. $(C_2H_5)_2CO$	[645]	820
	313–348	-	11.0	0	3.1	"	"	"
$C_2H_5 + C_2H_5SO_2 \rightarrow$ $\rightarrow C_2H_5SO_2C_2H_5$	313–348	-	13.9±0.4	0	~0	photol. $(C_2H_5)_2CO$	[645]	820
$C_2H_5 = C_2H_4 + H - 39{,}6$	673–778	-	14.78	0	40.9±0.5	Hg photo.	[1029]	820
	"	-	-	0	39.5	Hg photo., stat.	[280]	1101
	"	-	13.8	0	39.5	"	[280,1524]	
	"	-	14.0	0	40	"	[280, 922]	
	823–898	-	13.93	0	38 ± 2	therm.	[1011, 1012]	820
	673–893	-	14.37±0.20	0	39.72±±0.71	-	-	1102

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_2H_5 + C_2H_6 = C_2H_4 + H + C_2H_6$	673–773	-	18.18	0	31.8±2.0	Hg photo.	[1029]	
	823–893	-	18.60	0	32.4±2.0	therm.	[1011,1012]	820
$C_2H_5 \rightarrow C_2H_4 + H$	635–773	-	11.2	0	31	photol. C_2H_5CHO	[921]	820
	737	2	-	-	-	"	"	"
	903	1.93	-	-	-	therm.	[177]	105
	970–1300	-	17.32	-1	38	comp.	[1409]	1103
$CH_3CD_2 + (CH_3CD_2)_2CO = CH_3CHD_2 + CH_2CD_2COCD_2CH_3$	374–638	-	11.96	0	11.7	photol. $(CH_3CD_2)_2CO$	[1608]	1106
$CH_3CD_2 + (CH_3CD_2)_2CO = CH_3CD_3 + CH_3CDCOCD_2CH_3$	297–638	-	12.15	0	8.7	photol. $(CH_3CD_2)_2CO$	[1608]	1106
	"	-	11.39±0.2	0	9.2±0.4	"	[840]	1107
$C_2D_5 + H_2 = C_2HD_5 + H$	375–515	-	11.85	0	11.3±0.5	photol. $(C_2D_5)_2CO$	[190]	820
$C_2D_5 + C_2D_5 = C_2D_6 + C_2D_4$	323–456	-	-	-	-	photol. $(C_2D_5)_2CO$	[189]	1104
$C_2D_5 + n\text{-}C_4H_{10} = C_2HD_5 + C_4H_9$	379–467	-	11.33±0.29	0	10.4±0.75	photol. $(C_2D_5)_2CO$	[189,1227]	1105
$C_2D_5 + iso\text{-}C_4H_{10} = C_2HD_5 + C_4H_9$	360–457	-	10.92±0.27	0	8.9±0.6	photol. $(C_2D_5)_2CO$	[189]	1105
$C_2D_5 + (CH_3)_4C = C_2HD_5 + (CH_3)_3CCH_2$	359–458	-	11.55±0.29	0	12.60±0.7	photol. $(C_2D_5)_2CO$	[189]	1105
$C_2D_5 + n\text{-}C_6H_{14} = C_2HD_5 + C_6H_{13}$	375–515	-	11.44±0.20	0	10.1±0.5	photol. $(C_2D_5)_2CO$	[190]	820
$C_2D_5 + cyclo\text{-}C_6H_{12} = C_2HD_5 + cyclo\text{-}C_6H_{11}$	375–515	-	11.72±0.20	0	10.4±0.5	photol. $(C_2D_5)_2CO$	[190]	820
$C_2D_5 + C_2D_5COC_2D_5 = C_2D_6 + C_2D_4COC_2D_5$	300–587	-	11.59±0.20	0	9.6±0.4	photol. $(C_2D_5)_2CO$	[840,838]	820
	323–597	-	11.25±0.20	0	9.0±0.5	"	[189, 190]	820

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
n, iso-$C_3H_7 + Cl_2 =$ = n, iso-$C_3H_7Cl + Cl$	458	-	-	-	-	photochem.	[1760]	
n-$C_3H_7 + I_2 =$ n-$C_3H_7I + I$	298	-	-	-	-	photol. C_3H_7I	[354]	1108
	533-573	-	-	-	-	therm.	[1448, 1192]	1109
n-$C_3H_7 + I_2 =$ = iso-$C_3H_7I + I$	584-627	-	8.25	1/2	12.6	pyr. n-C_3H_7I	[864]	
iso-$C_3H_7 + I_2 =$ = iso-$C_3H_7I + I$	298	-	-	-	-	photol. iso-C_3H_7I	[354]	1110
n-$C_3H_7 + HI = C_3H_8 + I$	533-573	-	-	-	-	therm.	[1448, 1192]	1109
	"	-	11.64	-	-	-	[154]	1111
$C_3H_7 + C_2H_5 = C_3H_8 + C_2H_4$	365 and 510	-	-	-	-	photol.	[1280]	1112
n-$C_3H_7 + C_2H_5 =$ = $C_3H_8 + C_2H_4$	room	-	-	-	-	photol.	[1483]	1113
iso-$C_3H_7 + C_2H_5 =$ = $C_3H_8 + C_2H_4$	room	-	-	-	-	photol.	[1483]	1121
n-C_3H_7 + n-$C_3H_7 =$ = $C_3H_8 + C_3H_6$	291-423	-	-	-	-	photol. (n-$C_3H_7N)_2$	[692]	1114
	room	-	-	-	-	photol.	[1483]	1115
	297-403	-	-	-	-	photol. (n-$C_3H_7N)_2$	[911]	1116
	298	-	-	-	-	photol. n-C_3H_7CHO	[174]	1026
	298-464	13.20	-	-	-	photol. n-C_3H_7CHO	[916]	820
	303-381	-	-	-	-	photol. Hg(n-$C_3H_7)_2$	[329]	1051
	347-455	-	13.15	0	0	photol. CH_3COCH_3	[1496]	820
	373-423	-	-	-	-	photol. (n-$C_3H_7)_2CO$	[1596]	1117
	386	-	-	-	-	"	[1060]	1118

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
n-C_3H_7 + iso-C_3H_7 = = C_3H_8 + C_3H_6	room	-	-	-	-	photol.	[1483]	1119
iso-C_3H_7 + iso-C_3H_7 = = C_3H_8 + C_3H_6	293-534	13.82	-	-	-	photol. C_3H_7CHO	[917]	820
	room?	-	-	-	-	Hg photo.	[188]	1120
	room	-	-	-	-	photol.	[1483]	1122
	298	-	-	-	-	photol. iso-C_3H_7CHO	[174]	1123
	303-394	-	-	-	-	photol. $(C_3H_7N)_2$	[494]	1124
	303-473	-	-	-	-	H + C_3H_6	[1135]	1125
	304-400	-	-	-	-	photol. (iso-$C_3H_7N)_2$	[1319]	1126
	344-466	-	-	-	-	photol. $(C_3H_7)_2CO$	[841]	
	347-455	-	13.81	0	0	photol. CH_3COCH_3	[1496]	820
	373-473	-	14.19	0	0.9	photol. $(C_3H_7)_2CO$	[750]	820
	473	-	-	-	-	photol.	"	1127
n-C_3H_7 + C_3H_8 = = iso-C_3H_7 + C_3H_8	573-673	-	11	0	10 - 11	Hg photo.	[72]	
iso-C_3H_7 + C_3H_8 = = n-C_3H_7 + C_3H_8	714-776	-	12.1	0	17	pyr. C_3H_8	[987a]	1670
iso-C_3H_7 + sec-C_4H_9 = = C_3H_8 + C_4H_8	room?	-	-	-	-	Hg photo.	[188]	1079
iso-C_3H_7 + sec-C_4H_9 = = C_4H_{10} + C_3H_6	room?	-	-	-	-	Hg photo.	[188]	1079
iso-C_3H_7 + tert-C_4H_9 = = C_3H_8 + C_4H_8	room?	-	-	-	-	Hg photo.	[188]	1123
	345-355	-	-	-	-	photol.	[599]	1128
iso-C_3H_7 + tert-C_4H_9 = = C_4H_{10} + C_3H_6	room?	-	-	-	-	Hg photo.	[188]	1129
	346-352	-	-	-	-	photol.	[599]	1130

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
iso-C_3H_7 + iso-C_4H_{10} = = n-C_3H_7 + iso-C_4H_{10}	713-814	-	9.8	0	9.5	pyr. iso-C_4H_{10}	[954]	
iso-C_3H_7 + C_6H_7 = C_3H_8+ + C_6H_6	347-409	-	-	-	-	photol. (iso-$C_3H_7)_2CO$	[841]	1131
iso-C_3H_7 + cyclohexadienyl-1,4 = C_3H_8 + + C_6H_6	347-409	-	-	-	-	photol.	[843]	1132
iso-C_3H_7 + cyclohexadiene-1,3 = C_3H_8 + C_6H_7	315-406	-	12.09±0.4	0	7.1±0.6	photol. $(C_3H_7)_2CO$	[842]	820
iso-C_3H_7 + cyclohexadiene-1,4 = C_3H_8 + C_6H_7	347-409	-	11.89±0.6	0	6.5±1.0	photol. (iso-$C_3H_7)_2CO$	[841]	820
iso-C_3H_7 + cyclohexadiene-1,4 = C_3H_8 + + C_6H_7	347-409	-	11.89±0.7	0	6.4±1.1	photol.	[843]	820
n-C_3H_7 + n-C_3H_7CHO = C_3H_8 + n-C_3H_7CO	371-634	-	11.3	0	6.7	photol. C_3H_7CHO	[916]	820
n-C_3H_7 + n-C_3H_7CHO = = C_3H_8 + C_3H_6CHO	464-573	-	11.3	0	10.8	photol. C_3H_7CHO	[916]	820
iso-C_3H_7 + iso-C_3H_7CHO= = C_3H_8 + iso-C_3H_7CO	390-627	-	11.3	0	6.3	photol. C_3H_7CHO	[917]	820
iso-C_3H_7 + iso-C_3H_7CHO= = C_3H_8 + C_3H_6CHO	556-650	-	11.2	0	9.5	photol. C_3H_7CHO	[917]	820
n-C_3H_7 + CH_3COCH_3 = = C_3H_8 + CH_2COCH_3	403-503	-	11.05±0.2	0	8.4±0.4	photol. $(CH_3)_2CO$	[509]	820

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$n-C_3H_7 + (n-C_3H_7)_2CO = C_3H_8 + n-C_3H_7COC_3H_6$	328-434	-	10.7	0	6.5	photol. $(n-C_3H_7)_2CO$	[1060]	820
$iso-C_3H_7 + (iso-C_3H_7)_2CO = C_3H_8 + iso-C_3H_7COC_3H_6$	373-674	-	-	0	8.5±0.1	photol. $(C_3H_7)_2CO$	[750]	1133, 1134
$n-C_3H_7 + HCOO\,n-C_3H_7 = C_3H_8 + COO\,n-C_3H_7$	347-451	-	11.2	0	7.6	photol. CH_3COCH_3	[1496]	820
$iso-C_3H_7 + HCOO\,iso-C_3H_7 = C_3H_8 + COO\,iso-C_3H_7$	367-454	-	10.4	0	6.6	photol. CH_3COCH_3	[1496]	820
$iso-C_3H_7 + (iso-C_3H_7N)_2 = C_3H_8 + C_3H_6NN\,iso-C_3H_7$	303-394	-	10.4	0	6.5±0.5	photol. $(C_3H_7N)_2$	[494]	820
	334-400	-	10.64	0	6.42±0.36	"	[1319]	"
$n-C_3H_7 + (n-C_3H_7N)_2 = C_3H_8 + C_3H_6NN\,n-C_3H_7$	297-564	-	11.6	0	7.9	photol. $(n-C_3H_7N)_2$	[911]	820
$n-C_3H_7 + NO = n-C_3H_7NO$	298	≥10.6	-	-	-	photol. $n-C_3H_7I$	[354]	908
$iso-C_3H_7 + NO \rightarrow iso-C_3H_7NO$	508-550	12.8	-	-	-	pyr.	[1112, 342, 669]	
$n-C_3H_7 + O_2 = n-C_3H_7OO$	298	≥10.3	-	-	-	photol. $n-C_3H_7I$	[354]	908
$n-C_3H_7 + n-C_4H_9 \rightarrow C_7H_{16}$	318-457	-	-	-	-	photol. $n-C_3H_7CHO$ and $n-C_4H_9CHO$	[918]	1135
$iso-C_3H_7 + iso-C_3H_7 \rightarrow C_6H_{14}$	354-442	13.8	13.8	0	0	photol. $iso-C_3H_7CHO$, int. ill.	[1112]	
$n-C_3H_7 + n-C_4H_9 \rightarrow C_7H_{16}$	353-423	-	-	-	-	photol. ketone mixt.	[921]	1096

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
n-C_3H_7 + C_2H_4 → C_5H_{11}	373–468	-	10.9	0	6.5	photol. n-C_3H_7CHO	[916]	1136
	403–503	-	10.38±0.1	0	5.1±0.2	photol. $(CH_3)_2CO$	[509]	820
iso-C_3H_7 + C_2H_4 → → C_5H_{11}	373–458	-	11.4	0	6.9	photol. iso-C_3H_7CHO	[917]	1137
iso-C_3H_7 + C_2H_2 → → C_5H_9	363–481	-	11.2	0	6.9	photol. iso-C_3H_7CHO	[600]	820
iso-C_3H_7 + cyclohexa-diene-1,3 → C_9H_{15}	315–406	-	11.89±0.2	0	5.8±0.4	photol. $(C_3H_7)_2CO$	[842]	820
n-C_3H_7 → C_3H_6 + H	573–723	-	14.4	0	38 ± 1	Hg photo.	[279, 1524, 922]	
	620–694	-	13.6	0	35.0	photol. C_3H_7CHO	[916]	820, 1138
	653–753	-	14.1	0	37.0	photol. CD_3COCD_3	[823]	1139
n-C_3H_7 → C_2H_4 + CH_3	297–564	-	15.36	0	34.5	photol. $(n\text{-}C_3H_7N)_2$	[911]	820
	434–630	-	-	0	20 ± 1	photol. $(n\text{-}C_3H_7)_2CO$	[1060]	
	471–550	-	15.45$_4$	0	34.9	photol. $(CH_3N)_2$	[299]	1140
	543–694	-	11.7	0	25.2	photol. C_3H_7CHO	[916]	820
	573–723	-	-	0	20	Hg photo.	[279]	
	653–753	-	13.9	0	31.0	photol. CD_3COCD_3	[823]	1139
	near 673	-	-	0	19	Na+RBr, flow	[492]	
	300–750	-	14.76±0.31	0	33.54 ± ± 0.70	-	-	1141
iso-C_3H_7 → C_3H_6 + H	690–770	-	13.8	0	36.9	photol. C_3H_7CHO	[917]	820, 953
	742–814	-	16.2±1.7	0	47.2±5.8	pyr.	[954]	1142
	600–723	-	14.6	0	38 ± 1	Hg photo.	[279, 922]	
iso-C_3H_7 → C_2H_4 + + CH_3	690–770	-	10.6	0	29.5	photol. n-C_3H_7CHO	[917]	820
	713–814	-	12.0±0.2	0	34.5±0.5	pyr.	[954]	
	690–814	-	11.28±0.68	0	31.88± ±2.30	-	-	1143
C_3H_7 → CH_3 + C_2H_4	573–673	-	9.6	0	22.0	Hg photo.	[72]	
C_3H_7 → H + C_3H_6	573–673	-	14	0	37.0	Hg photo.	[72]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3CDCH_3 + CH_3CDCH_3 =$ = disproportionation	? - 373	-	-	-	-	photol. $(C_3H_6D)_2CO$	[751]	1144
$(CH_3)_2CD + (C_3H_6D)_2CO = CH_3CHDCH_3 + C_3H_6DCOCDCH_2CH_3$	573-678	-	11.75_5	0	11.7±1.1	photol. $(C_2H_6CD)_2CO$	[751]	820
$(CH_3)_2CD + (C_3H_6D)_2CO = CH_3CD_2CH_3 + (CH_3)_2CCOCD(CH_3)_2$	473-676	-	11.11	0	9.3±0.3	photol. $(C_2H_6CD)_2CO$	[751]	820
$CH_3CDCH_3 \rightarrow CH_3CDCH_2 + H$	686-777	-	16.03	0	35±1	photol. $(C_3H_6D)_2CO$	[751]	820
$CH_3CDCH_3 \rightarrow CH_2CHD + CH_3$	686-777	-	15.05	0	32.5±2	photol. $(C_3H_6D)_2CO$	[751]	820
$2CD_2CH_2CH_3 = CH_3CH_2CHD_2 + CH_3CHCD_2$	298-355	-	-	-	-	photol. $CH_3COCD_2C_2H_5$	[52]	1145,1146
$CH_3CD_2CH_2 \rightarrow CH_3CDCH_2 + D$	658-753	-	-	-	-	photol. CD_3COCD_3	[823]	1147
	? -828	-	-	-	-	therm.	[1093]	1148
$CD_3CHCH_3 \rightarrow CD_2CHDCH_3$	? -828	-	-	-	-	therm.	[1093]	1149

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$n-C_4H_9 + C_2H_6 =$ $= C_4H_{10} + C_2H_5$	823-999	-	11.7	0	15 ± 4	pyr. C_2H_6	[1013]	
$n-C_4H_9 + n-C_4H_9 =$ $= C_4H_{10} + C_4H_8$	298-520	-	-	-	-	photol.	[1141]	1150
	334-502	-	14.6	0	1.3	photol. $n-C_4H_9CHO$	[918]	820
	413	-	-	-	-	Hg photo.	[1137]	1151
$n-C_4H_9 + C_3H_6 =$ $n-C_4H_{10} + C_3H_5$	823-893	-	11.7	0	15 ± 4	pyr. C_2H_6	[1013]	
$n-C_4H_9 + n-C_4H_9CHO =$ $= C_4H_{10} + n-C_4H_9CO$	334-502	-	10.9	0	5.4	photol. C_4H_9CHO	[921]	820
$n-C_4H_9 + HCOO\text{-}n\text{-}C_4H_9 =$ $= C_4H_{10} + COO\text{-}n\text{-}C_4H_9$	348-457	-	10.2	0	5.3	photol. CH_3COCH_3	[1497]	820
$n-C_4H_9 + (n-C_4H_9N)_2 =$ $= n-C_4H_{10} + R$	298-520	-	11.15	0	7.1	photol.	[1141]	
$iso-C_4H_9 + iso-C_4H_9 =$ $= C_4H_{10} + C_4H_8$	293	-	-	-	-	photol.	[1484]	1152
	296-598	-	-	-	-	"	[1411]	1153
	297-493	-	-	-	-	$H + C_4H_8$	[1137]	1154
	299-397	-	13.21±0.03	0	0	photol. $iso-C_4H_9CHO$	[1111]	820
	373	13.62	-	-	-	photol. $(iso-C_4H_9)_2CO$	[960]	820, 1155
$iso-C_4H_9 + iso-C_4H_9CHO$ $= C_4H_{10} + iso-C_4H_9CO$	390-503	-	11.71±0.07	0	6.5±0.1	photol. C_4H_9CHO	[1111]	820
$iso-C_4H_9 + iso-C_4H_9CHO$ $= C_4H_{10} + C_4H_8CHO$	451-580	-	12.62±0.05	0	12.7±0.2	photol. C_4H_9CHO	[1111]	820
$iso-C_4H_9 +$ $+ (iso-C_4H_9)_2CO =$ $= C_4H_{10} +$ $+ iso-C_4H_9COC_4H_8$	351-467	-	11.42	0	7.6	photol. $(iso-C_4H_9)_2CO$	[960]	820
	"	-	11.06±0.09	0	6.83±0.16	-	[1111, 960]	1156
$iso-C_4H_9 + (iso-C_4H_9N)_2 =$ $= iso-C_4H_{10} + C_8H_{17}N_2$	296-598	-	10.5	0	6.7	photol.	[1411]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
sec-C_4H_9 + sec-C_4H_9 = = C_4H_{10} + C_4H_8	170–298	-	-	-	-	dis. , flow	[1293]	1157
	room	-	-	-	-	Hg photo.	[188]	1158
	298–513	-	13.85	0	-0.5	photol. sec-C_4H_9CHO	[694]	820, 1159
	373	14.35_5	-	-	-	photol. (sec-$C_4H_9)_2CO$	[960]	820
	381–412	-	-	-	-	pyr. (tert-$C_4H_9O)_2$	[1127]	1160
sec-C_4H_9 + tert-C_4H_9 = = C_4H_{10} + C_4H_8	room	-	-	-	-	Hg photo.	[188]	1161, 1162
sec-C_4H_9 + sec-C_4H_9CHO = = C_4H_{10} + sec-C_4H_9CO	298–615	-	10.68	0	4.9	photol. sec-C_4H_9CHO	[694]	820
tert-C_4H_9 + HBr = = $(CH_3)_3CH$ + Br	313–358	-	-	0	7.7±0.3	photochem.	[500]	1163
	371–425	-	-	-	-	"	[800]	
tert-C_4H_9 + HI = = $(CH_3)_3CH$ + I	525–583	-	-	-	-	therm.	[156]	1164
tert-C_4H_9 + tert-C_4H_9 = = C_4H_{10} + C_4H_8	293	-	-	-	-	photol.	[1484]	1165
	room	-	-	-	-	Hg photo.	[188]	
	293–333	-	-	-	-	photol. (tert-$C_4H_9O)_2$	[588]	1167
	296–573	-	-	-	-	H + C_4H_8	[1137]	1166
	300–503	-	14.64	0	0	photol. tert-C_4H_9CHO	[169]	
	323–353	-	-	-	-	photol.	[599]	1169
	375–595	14.66	-	-	-	photol. (tert-$C_4H_9)_2CO$	[960]	820
tert-C_4H_9 + cyclohexadienyl-1,4 = = C_4H_{10} + C_6H_6	300–373	-	-	-	-	photol.	[843]	1170
tert-C_4H_9 + cyclohexadiene-1,4 = = C_4H_{10} + C_6H_7	300–373	-	11.49±0.5	0	5.3±8	photol.	[843]	820
tert-C_4H_9 + tert-C_4H_9CHO = = C_4H_{10} + tert-C_4H_9CO	333–659	-	10.5	0	4.3	photol. tert-C_4H_9CHO	[169]	820

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
tert-C_4H_9 + tert-C_4H_9CHO = = C_4H_{10} + C_4H_8CHO	515–797	-	11.9	0	10.0	photol. tert-C_4H_9CHO	[169]	820
n-C_4H_9 + C_2H_4 → → C_6H_{13}	354–449	-	11.1	0	7.3	photol. C_4H_9CHO	[918]	820
tert-C_4H_9 + C_2H_4 → → C_6H_{13}	385–456	-	11.2	0	7.1	photol. C_4H_9CHO	[169]	820
sec-C_4H_9 + C_3H_6 → → C_7H_{15}	381–412	-	12.3	0	9.2	pyr. (tert-$C_4H_9O)_2$	[1127]	820
tert-C_4H_9 + C_2H_2 → → C_6H_{11}	373–493	-	10.7	0	5.3	photol. tert-C_4H_9CHO	[600]	820
tert-C_4H_9 + tert-C_4H_9 → → C_8H_{18}	354–388	12.5	-	-	-	photol. tert-C_4H_9CHO	[1110]	
n-C_4H_9 → C_4H_8 + H	823–893	-	14.0	0	40 ± 4	pyr. C_2H_6	[1013]	
n-C_4H_9 → C_3H_6 + CH_3	523–650	-	11.0	0	23	Hg photo.	[278, 1524, 922]	
	571–689	-	12.1	0	27.1	photol. C_4H_9CHO	[921, 918, 922, 1524]	820
n-C_4H_9 → sec-C_4H_9 → → CH_3 + C_3H_6	913–933	-	14.71_6	0	41.0	pyr. C_2H_6	[1013]	
n-C_4H_9 → C_2H_4 + C_2H_5	298–520	-	13.57	0	28.7	photol.	[1141]	
	477–664	-	11.2	0	22.0	photol. C_4H_9CHO	[921, 918, 922]	820
	573–673	-	11.0	0	23	Hg photo.	[278, 1524]	
iso-C_4H_9 → C_4H_8 + H	598–673	-	15.4	0	40	Hg photo.	[278, 1524]	
	602–690	-	13.0	0	30.7	photol. C_4H_9CHO	[1111]	820
	-	-	13.1	0	35	-	[922]	1179
iso-C_4H_9 → C_3H_6 + CH_3	296–598	-	12.38	0	31.0	photol.	[1411]	
	552–690	-	12.82±0.08	0	26.2±0.3	photol. C_4H_9CHO	[1111, 922]	820, 1172
	598–673	-	8.5	0	18.5	Hg photo.	[278, 1524]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	782-857	-	-	-	-	pyr. $(CH_3)_3CD$	[825]	1173
sec-$C_4H_9 \rightarrow C_3H_6 + CH_3$	503-628	-	11.66	0	24.0	photol. C_4H_9CHO	[694]	820
	-	-	11.0	0	23	-	[1524]	1174
	533-613	-	15.12	0	32.6	pyr.	[1014]	820
tert-$C_4H_9 \rightarrow C_4H_8 + H$	666-797	-	16.3	0	43.6	photol. C_4H_9CHO	[169,922]	820
	-	-	15.4	0	40	-	[1524]	1175
tert-$C_4H_9 \rightarrow C_3H_6 + CH_3$	742-797	-	16.0	0	46.3	photol. C_4H_9CHO	[169,922]	820
	-	-	8.5	0	18.5	-	[1524]	1175
$(CH_3)_2CDCH_2 \rightarrow$	782-857	-	-	-	-	pyr. $(CH_3)_3CD$	[825]	1176
$\rightarrow CH_3CDCH_2 + CH_3$	? -823	-	-	-	-	therm.	[1093]	1177
$(CH_3)_3CCH_2 + HBr =$ $= (CH_3)_4C + Br$	370-425	-	-	-	9.6$\pm$2	photochem.	[800,500]	1178
sec-$C_6H_{13} \rightarrow$ n-C_3H_7 + $+ C_3H_6$	823-999	-	13.50_5	0	26.0	pyr. C_2H_6	[1013]	1179

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
cyclo-C_3H_5 + cyclo-C_3H_5CHO = cyclo-C_3H_6 + cyclo-C_3H_5CO	459	8.4	-	-	-	photol. cyclo-C_3H_5CHO	[682]	1180
cyclo-C_3H_5 + C_3H_5 → cyclo-$C_3H_5C_3H_5$	405	-	-	-	-	photol. cyclo-C_3H_5CHO	[682]	1096
cyclo-C_3H_5 → CH_2CHCH_2	373–473	-	13	0	~20	photol. $CH_3N_2CH_3$	[681]	1181
	459	2.4	-	0	22	photol. cyclo-C_3H_7CHO	[682]	1182
cyclo-C_4H_7 → $CH_2CHCH_2CH_2$	558–672	-	-	0	18.1±0.8	photol. cyclobutane and acetone-d_6	[649]	
cyclo-C_5H_9 + cyclo-C_5H_9 = cyclo-C_5H_{10} + cyclo-C_5H_8	298–523	-	-	-	-	Hg photo.	[1439]	1183
	302	-	-	-	-	"	[132]	1054
cyclo-C_5H_9 → C_2H_4 + C_3H_5	523–628	-	-	0	37	Hg photo.	[1439]	
	578–675	-	13.5	0	37.7	pyr. cyclo-C_5H_{10}	[647]	
cyclo-C_6H_{11} + cyclo-C_6H_{11} = cyclo-C_6H_{12} + cyclo-C_6H_{10}	302	-	-	-	-	Hg photo.	[131]	1184
2 methylcyclopentyl → $C_{12}H_{22}$	302	-	-	-	-	Hg photo.	[1368]	
1,3-cyclohexadiene + NO = HNO + C_6H_7	631	~10.9	-	-	-	therm.	[1397]	
2 cyclo-C_6H_7 = C_6H_6 + cyclo-C_6H_8, $C_{12}H_{14}$	336–374	-	-	-	-	photol.	[844]	1185
cyclo-C_6H_7 → C_6H_6 + H	409–459	-	-	0	31	photol.	[844]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_2H + CH_4 = C_2H_2 + CH_3$	300	-	-	-	-	photol. HC_2Br	[1467]	1186
$C_2H + C_2H_6 = C_2H_2 + C_2\dot{H}_5$	300	-	-	-	-	photol. HC_2Br	[1467]	1186
C_2H + n-$C_4H_{10} = C_2H_2 + C_4H_9$	300	-	-	-	-	photol. HC_2Br	[1467]	1186
C_2H + iso-C_4H_{10} = $C_2H_2 + C_4H_9$	300	-	-	-	-	photol. HC_2Br	[1467]	1186
$C_2H + C(CH_3)_4 = C_2H_2 + C(CH_3)_3CH_2$	300	-	-	-	-	photol. HC_2Br	[1467]	1186
$C_2H + C_2(CH_3)_6 = C_2H_2 + C_2(CH_3)_5CH_2$	300	-	-	-	-	photol. HC_2Br	[1467]	1186
C_2H + cyclo-C_3H_6 = C_2H_2 + cyclo-C_3H_5	300	-	-	-	-	photol. HC_2Br	[1467]	1186
C_2H + cyclo-C_4H_8 = C_2H_2 + cyclo-C_4H_7	300	-	-	-	-	photol. HC_2Br	[1467]	1186
C_2H + spiro-C_5H_8 = C_2H_2 + spiro-C_5H_7	300	-	-	-	-	photol. HC_2Br	[1467]	1186
C_2H + cyclo-C_5H_{10} = C_2H_2 + cyclo-C_5H_9	300	-	-	-	-	photol. HC_2Br	[1467]	1186
C_2H + cyclo-C_6H_{12} = C_2H_2 + cyclo-C_6H_{11}	300	-	-	-	-	photol. HC_2Br	[1467]	1186
C_2H + cyclo-C_6D_{12} = C_2HD + cyclo-C_6D_{11}	300	-	-	-	-	photol. HC_2Br	[1467]	1186
$C_2H + C_2H_5Cl = C_2H_2 + C_2H_4Cl$	300	-	-	-	-	photol. HC_2Br	[1467]	1186
$C_2H_3 + H_2 = C_2H_4 + H$	1200–1700	-	12.7	0	6.8	est. from k_and K	[152]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	1276–1784	-	12.9	0	7.4	est., from k_ and K	[151]	1187
$C_2H_3 + HI = C_2H_4 + I$	room	-	-	-	-	photol. HI	[1314]	1188
$C_2H_3 + C_2H_4 = C_4H_6 + H$	1276–1784	-	11.7	0	7.3	est., from k_ and K	[151]	1189
$C_2H_3 + C_2H_2 \rightarrow C_4H_5$	1180–1774	11.3	-	-	-	est.	[151]	
$C_2H_3 + M = C_2H_2 + H + M$	1169–1784	-	14.9	0	31.5	therm., est.	[151]	
	1200–1700	-	14.8	0	30.9	"	[152]	
$C_3H_5 + I_2 = C_3H_5I + I$	481–573	-	12.2±0.5	0	0 ± 1	therm.	[633]	
$C_3H_5 + HI = C_3H_6 + I$	481–573	-	11.7±0.3	0	1.5±1	therm.	[633]	
$HC{=}CHCH{=}CH_2 + H_2 = C_4H_6 + H$	1180–1774	-	12.4	0	5.9	est., from k_ and K	[151]	1190
$H_2C{=}CCH{=}CH_2 + H_2 = C_4H_6 + H$	1180–1774	-	12.4	0	5.9	est., from k_ and K	[151]	1191
$CH_2CHCH_2CH_2 \rightarrow CH_3CHCHCH_2$	560–700	-	-	0	20.0±0.7	photol. cyclobutane and acetone-d_6	[649]	
$HC{=}CHCH{=}CH_2 \rightarrow C_4H_4 + H$	1209–1412	-	14.7	0	45.7	from k_ and K	[151]	1192
$H_2C{=}CCH{=}CH_2 \rightarrow C_4H_4 + H$	1209–1412	-	14.8	0	58.7	from k_ and K	[151]	1193
$C_4H_5 \rightarrow C_2H_3 + C_2H_2$	1180–1774	-	13.7	0	40.0	est., from k_ and K	[151]	1194
CH_3 butadiene + butadiene $\rightarrow C_9H_{15}$	413–434	-	-	0	2.6	pyr. $(tert\text{-}C_4H_9O)_2$	[1554a]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_6H_5 + H_2 = C_6H_6 + H$	453–623	-	10.97	0	6.5±1	photol. $Hg(C_6H_5)_2$	[552]	1195
$C_6H_5 + CH_4 = C_6H_6 + CH_3$	453–623	-	11.19	0	7.5±0.5	photol. $Hg(C_6H_5)_2$	[552]	1195
$C_6H_5 + CHF_3 = C_6H_6 + CF_3$	453–623	-	10.17	0	5.2±0.5	photol. $Hg(C_6H_5)_2$	[552]	1195
$C_6H_5CH_2 + I_2 = C_6H_5CH_2I + I$	480–666	-	10.75±0.5	0	0 ± 1	est.	[1566]	
$C_6H_5CH_2 + HBr = C_6H_5CH_3 + Br$	363–406	-	-	0	5.0±1.2	photochem.	[28]	1196
$C_6H_5CH_2 + HI = C_6H_5CH_3 + I$	480–666	-	10.25±0.5	0	1.5±1	est.	[1566]	
$C_6H_4CH_3 + D_2 = C_6H_4DCH_3 + D$	484	-	-	-	-	pyr. of xylene	[272]	1197
$(C_6H_5)_3C + (C_6H_5)_3C \rightarrow (C_6H_5)_3CC(C_6H_5)_3$	209–264	-	10.58_5	0	6.9	-	[1768a, 1730]	
$C_6H_5OCH_2 \rightarrow C_6H_5CHO + H$	453–539	-	12.5	0	21	pyr., flow	[1157]	1198
$CF_2ClC_6H_6 \rightarrow CF_2Cl + C_6H_6$	375–537	-	-	0	11.4±0.8	photol.	[1037]	
$CF_2ClC_6D_6 \rightarrow CF_2Cl + C_6D_6$	360–427	-	-	0	11.2	photol.	[1038]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CF_2 + NO \rightarrow CF_2NO$	1600-2500	-	13.95±0.34	0	29.2±3.3	shock	[1129]	
$CF_2 + O_2 = CO + O + F + F$	1500-2500	-	10.46_5	0	13.28	shock	[1132]	
$CF_2 + O_2 \rightarrow CF_2O_2$	296	-	-	-	-	Hg photo. N_2O	[745]	1199
$CF_2 + F_2 = CF_3 + F$	1700-3000	-	11.3	1/2	2.12	est.	[1133]	
CF_2 triplet $+ O_2 = CF_2O_2$	296	-	-	-	-	Hg photo.	[745]	1200
$CF_2 + CF_2 = C_2F_4$	298-580	-	9.87	1/2	1.2	pulse photol.	[434]	
$CF_2 + C_2F_4 \rightarrow C_3F_6$	294-495	-	9.6	0	6.7	Hg photo.	[399]	1201
	296	-	-	-	-	"	[1357]	1202
$CF_2 + Ar = CF + F + Ar$	2600-3700	-	26.61±0.07	-2.85 ±0.62	106.0±5.7	shock	[1128]	
$CF_3 + H_2 = CF_3H + H$	332-458	-	11.84	0	9.5±0.7	photol. CF_3COCF_3	[66]	1203, 1204, 1205
	333-870	-	12.45	0	10.66±0.14	"	[924a]	1203
	336-374	-	11.68	0	9.1	"	[37]	
	400	6.65	-	-	-	"	[66]	1203
	492-619	-	11.60_4	0	8.8	photol. CF_3NNCF_3	[1272]	1203, 1206
	970-1300	-	11.89	0	25.14	comp.	[1409]	
	330-620	-	11.82±0.10	0	9.39±0.18	-	-	1207
$CF_3 + HD = CF_3H + D$	333-870	-	12.05	0	10.77± ±0.15	photol. $(CF_3)_2CO$	[924a]	1203
	375-447	-	11.78	0	10.5±1.5	"	[66]	1203
	400	6.04	-	-	-	"	"	"
$CF_3 + HD = CF_3D + H$	333-870	-	12.16	0	11.63 ± ± 0.13	photol. $(CF_3)_2CO$	[924a]	1203
	375-447	-	11.32	0	10.2±1.5	"	[66]	1203
	400	5.75	-	-	-	"	"	"
$CF_3 + D_2 = CF_3D + D$	333-870	-	12.32	0	11.66 ± ± 0.11	photol. $(CF_3)_2CO$	[924a]	1203
	359-469	-	11.45	0	10.2±0.7	"	[66]	1203, 1205

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	400	5.88	-	-	-	photol. $(CF_3)_2CO$	[66]	1203
	492–619	-	11.44_3	0	9.7	photol. CF_3NNCF_3	[1272]	1203, 1206
	360–620	-	11.92±0.25	0	11.00 ± ± 0.525	-	-	1208
$CF_3 + F_2 = CF_4 + F$	1800–2200	-	10.34	1/2	2,895	est.	[1133]	
$CF_3 + Cl_2 = CF_3Cl + Cl$	399–505	-	12.89	0	3.6±0.5	photol. CF_3COCF_3	[22]	1203
$CF_3 + Br_2 = CF_3Br + Br$	328–607	-	-	-	-	photol. CF_3COCF_3	[1533]	1209
	451–600	-	12.36	0	0.7±0.5	"	[22]	1203
$CF_3 + I_2 = CF_3I + I$	358–508	-	12.41_4	0	0.0±0.5	photol. CF_3COCF_3	[1533, 22]	1203
	"	-	-	-	-	photol. CF_3COCF_3	[1533]	1210
$CF_3 + HCl = CF_3H + Cl$	293–478	-	11.23	0	5.1±0.5	photol.	[22]	1203
$CF_3 + HBr = CF_3H + Br$	328–607	-	11.77_8	0	2.9±0.5	photol. CF_3COCF_3	[1533, 22]	1203
	665–755	-	11.94	0	2.83±0.50	therm.	[25]	1211, 1212
$CF_3 + HBr = CF_3Br + H$	970–1300	-	10.71	0	84.21	comp.	[1409]	
$CF_3 + HI = CF_3H + I$	346–562	-	11.73±0.08	0	0.5±0.5	photol. $(CF_3)_2CO$	[24]	1213
$CF_3 + H_2S = CF_3H + HS$	336–374	-	11.65±0.16	0	3.88±0.26	photol. $(CF_3)_2CO$	[37]	1203
	368–434	-	11.2±0.1	0	1.2 ±0.1	"	[874]	1634
$CF_3 + N_2O = CF_3O + N_2$	608–648	-	13.14	0	24.0	photol. $(CF_3)_2CO$	[135]	
$CF_3 + CH_3 = CF_2CH_2 + HF$	296–518	-	-	0	1.9	photol. $(CH_3)_2CO$+ $(CF_3)_2CO$	[627, 1263]	1214
$CF_3 + CH_4 = CF_3H + CH_3$	303–623	-	~11.16	0	9.5±2	photol. $(CF_3N)_2$	[1274]	1203
	357–534	-	11.98	0	11.0±0.1	photol. CF_3COCF_3	[320]	1203, 1215
	357–633	-	12.05_5 ± $±0.14_5$	0	11.2±0.2	-	[626]	1216
	395–524	-	11.70	0	10.3±0.5	photol. $(CF_3)_2CO$	[67]	1203, 1217, 1206
	412–633	-	12.15±0.15	0	11.5±0.3	"	[626]	1203

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	426-568	-	$11.90_5 \pm 0.22_5$	0	11.3±0.5	photol. $(CF_3)_2CO$	[9]	1203
	444-580	-	10.97	1/2	10.4	photol. CF_3CHO	[476]	1203, 1206
	300-630	-	11.53±0.18	0	10.16 ± 0.37	-	-	1218
$CF_3 + CH_2D_2 = CF_3H + CHD_2$	1000-1900	-	-	-	-	shock	[857]	1219
$CF_3 + CHD_3 = CF_3H + CD_3$	328-627	-	11.04	0	10.5±0.3	photol. CF_3COCF_3	[1393]	1203
$CF_3 + CHD_3 = CF_3D + CHD_2$	328-627	-	11.33	0	$12.7_5 \pm 0.3$	photol. CF_3COCF_3	[1393]	1203
$CF_3 + CD_4 = CF_3D + CD_3$	379-560	-	11.18	0	12.1±2.1	photol. CF_3COCF_3	[320]	1203, 1215
	412-633	-	12.08±0.17	0	13.3±0.2	"	[626]	1203
$CF_3 + C_2H_6 = CF_3H + C_2H_5$	353-489	-	11.67	0	7.5±0.5	photol. $(CF_3)_2CO$	[67, 951]	1203, 1217, 1204
$CF_3 + C_2H_3D_3 = CF_3D + C_2H_3D_2$	-	-	13.08	0	9.8	calc.	[320]	
$CF_3 + C_3H_8 = CF_3H + C_3H_7$	300-392	-	11.38	0	6.5±0.5	photol. CF_3COCF_3	[68]	
	483-578	-	11.67	0	6.2	photol. CF_3NNCF_3	[1272, 951]	1203,1204
$CF_3 + (CH_3)_2CD_2 = CF_3D + (CH_3)_2CD$	-	-	13.08	0	9.3	calc.	[320]	
$CF_3 + n\text{-}C_4H_{10} = CF_3H + CH_3CHCH_2CH_3$	302-366	-	11.2	0	5.1±0.3	photol. $(CF_3)_2CO$	[68]	1220
	303-623	-	10.86	0	5.5±1	photol. $(CF_3N)_2$	[1274]	1203
	357-435	-	11.31±0.16	0	5.74±0.28	photol. CF_3I	[1144]	1221
	395-516	-	11.46	0	5.3	photol. CF_3NNCF_3	[1272, 951]	1203
	300-620	-	11.18±0.52	0	5.34±0.90	-	-	1222
	300-520	-	11.45±0.50	0	5.60±0.86	-	-	1223
$CF_3 + iso\text{-}C_4H_{10} = CF_3H + (CH_3)_3C$	301-357	-	11.18	0	4.7±0.3	photol. $(CF_3)_2CO$	[68]	1204
	444-508	-	10.41	1/2	4.5	photol. CF_3CHO	[476]	1203

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CF_3 + (CH_3)_3CD = CF_3D + (CH_3)_3C$	335–480	–	12.48	0	7.4±1.0	photol. CF_3COCF_3	[320]	1203
$CF_3 + (CH_3)_4C = CF_3H + C_5H_{11}$	513–588	–	11.76	0	7.6	photol. CF_3NNCF_3	[1272, 951]	1203, 1204
CF_3 + 2,3-dimethylbutane = $CF_3H + C_6H_{13}$	515–572	–	10.22	0	1.7	photol. CF_3NNCF_3	[1272]	1203, 1204
CF_3 + cyclo-C_5H_{10} = CF_3H + cyclo-C_5H_9	485–565	–	11.54	0	4.7	photol. CF_3NNCF_3	[1272, 951]	1203, 1204
CF_3 + cyclo-C_6H_{12} = CF_3H + cyclo-C_6H_{11}	292–364	–	11.44	0	5.00±0.20	photol. CF_3COCF_3	[335]	1203, 1224
$CF_3 + C_6H_6 = CF_3H + C_6H_5$	296–359	–	11.35	0	6.30±0.20	photol. CF_3COCF_3	[335]	1224, 1203, 1204
$CF_3 + C_6H_5CH_3 = CF_3H + C_6H_5CH_2$	298–354	–	11.10	0	5.37±0.26	photol. CF_3COCF_3	[335]	1224, 1203, 1204
	–	–	11.33	0	6.0	photol. CF_3NNCF_3	[1272, 951]	1203
	300–383	–	11.59±0.20	0	5.91±0.30	photol. CF_3COCF_3	[794, 793]	1225
CF_3 + ortho-xylene = $CF_3H + CH_3C_6H_4CH_2$	310–341	–	11.68	0	5.55±0.54	photol. CF_3COCF_3	[335]	1203, 1224
$CF_3 + CH_3OH = CF_3H + CH_2OH$	357–435	–	10.0	0	4.7	photol. CF_3I	[1144]	1221
	388–588	–	11.18	0	8.3±0.9	photol. $(CF_3N)_2$	[319]	1226, 1227
$CF_3 + CH_3OH = CF_3H + [CH_3O]$	357–435	–	9.92±0.15	0	3.74±0.27	photol. CF_3I	[1144]	1221
	388–528	–	12.18	0	8.3±0.4	photol. $(CF_3N)_2$	[319]	1226, 1228
$CF_3 + CH_3OD = CF_3H + CH_2OD$	407–525	–	12.18	0	8.3±0.4	photol. $(CF_3N)_2$	[319]	1226, 1228
$CF_3 + CD_3OH = CF_3D + CD_2OH$	357–435	–	10.20±0.23	0	6.61±0.63	photol. CF_3I	[1144]	1221
	388–528	–	–	–	–	photol. $(CF_3N)_2$	[319]	1229

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CF_3 + CD_3OH = CF_3H + CD_3O$	357–435	-	9.48±0.35	0	3.24±0.63	photol. CF_3I	[1144]	1221
$CF_3 + CD_3OD = CF_3D + [CD_3O]$	407–525	-	12.28	0	10.1±0.4	photol. $(CF_3N)_2$	[319]	1226, 1230
$CF_3 + CH_3CHO = CF_3H + CH_3CO$	444–525	-	10.08	1/2	4.0	photol. CF_3CHO	[476]	1203
$CF_3 + CH_3COCH_3 = CF_3H + CH_2COCH_3$	302–442	-	10.77	0	6.9±0.1	photol. $(CH_3)_2CO$+ $(CF_3)_2CO$	[1264]	1203, 1231
	375–473	-	11.51±0.08	0	8.27±0.17	photol. $(CF_3)_2CO$+ $(CH_3)_2CO$	[1264, 627]	1203, R
	513–588	-	11.51	0	8.0	photol. CF_3NNCF_3	[1272, 951]	1203
$CF_3 + CH_3NH_2 = CF_3H + [CNH_4]$	303–435	-	10.79±0.16	0	4.2±0.3	photol.	[1145]	1232
$CF_3 + CH_3NH_2 = CF_3H + CH_2NH_2$	303–435	-	10.72±0.39	0	4.2±0.6	photol.	[1145]	1232
$CF_3 + (CH_3)_2NH = CF_3H + C_2H_6N$	303–370	-	11.45±0.12	0	4.1±0.2	photol. CF_3I	[1146]	1233
	323–370	-	10.5±0.7	0	3.3±1.0	"	"	"
$CF_3 + (CH_3)_3N = CF_3H + CH_2(CH_3)_2N$	303–435	-	11.82±0.12	0	4.5±0.2	photol. CF_3I	[1146]	1233
$CF_3 + CD_3NH_2 = CF_3D + CD_2NH_2$	303–435	-	11.03±0.09	0	6.1±0.2	photol.	[1145]	1232
$CF_3 + (CH_3)_2ND = CF_3H + CH_2CH_3ND$	323–370	-	11.82±0.51	0	5.1±0.8	photol. CF_3I	[1146]	1233
$CF_3 + (CH_3)_2ND = CF_3D + (CH_3)_2N$	323–370	-	10.88±0.29	0	4.7±0.5	photol. CF_3I	[1146]	1233
$CF_3 + CD_3NH_2 = CF_3H + CD_3NH$	303–435	-	9.94±0.22	0	4.4±0.4	photol.	[1145]	1232

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CF_3 + (CH_2)_2NH = CF_3H + C_2H_4N$	303-435	-	11.00±0.17	0	4.1±0.3	photol. CF_3I	[1146]	1233
$CF_3 + CH_3F = CF_3H + CH_2F$	469-632	-	$12.11_5 \pm 0.09_5$	0	11.2±0.2	photol. CF_3COCF_3	[626]	1203
$CF_3 + CH_2F_2 = CF_3H + CHF_2$	448-636	-	11.84±0.12	0	11.2±0.3	photol. CF_3COCF_3	[626]	1203
$CF_3 + CF_3CH_3 = CF_3H + CF_3CH_2$	423-673	-	12.50±0.13	0	14.5±0.3	photol. CF_3COCF_3	[626]	1203, 1234
	566-678	-	12.92±0.12	0	15.8±0.2	"	"	1203
$CF_3 + CF_2HCF_2H = CF_3H + CF_2HCF_2$	510-683	-	11.95±0.09	0	12.4±0.3	photol. CF_3COCF_3	[626]	1203
	"	-	11.76±0.18	0	11.9±0.3	"	"	1203, 1234
$CF_3 + CF_3CF_2H = CF_3H + C_2F_5$	507-724	-	11.27±0.11	0	11.5±0.3	photol. CF_3COCF_3	[626]	1203
$CF_3 + CF_3CHO = CF_3H + CF_3CO$	400-557	-	11.95±0.10	0	8.8±0.2	photol. $(CF_3)_2CO$	[1147]	1233
	423-673	-	10.97	1/2	8.2±0.5	photol. CF_3CHO	[476]	1203
$CF_3 + C_2F_5CHO = CF_3H + C_2F_5CO$	357-557	-	11.12±0.09	0	6.7±0.2	photol. $(CF_3)_2CO$	[1147]	1233
$CF_3 + C_3F_7CHO = CF_3H + C_3F_7CO$	400-557	-	11.09±0.11	0	6.6±0.2	photol. $(CF_3)_2CO$	[1147]	1233
$CF_3 + CH_3COCF_3 = CF_3H + CH_2COCF_3$	299-624	-	10.33	0	6.6	photol. CF_3COCH_3	[1405]	1203
$CF_3 + C_6H_5COCF_3 = ?$	465-607	-	10.12	0	7.2±0.5	photol. $C_6H_5COCF_3$	[1416a]	1203
$CF_3 + CH_3Cl = CF_3H + CH_2Cl$	417-523	-	12.10±0.08	0	10.6±0.2	photol. CF_3COCF_3	[9]	1203
	438	6,56	-	-	-	photol. and pyr. CF_3NNCF_3	[11]	"
	465	$6,74_2$	-	-	-	"	"	"
$CF_3 + CH_3Cl = CF_3Cl + CH_3$	673	≤ 5,36	-	-	≥ 17	photol. CF_3COCF_3	[9]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CF_3 + CH_2Cl_2 = $ $= CF_3H + CHCl_2$	358-477	-	11.18±0.07	0	7.6±0.1	photol. CF_3COCF_3	[10]	1203
$CF_3 + CH_2Cl_2 = CF_3Cl +$ $+ CH_2Cl$	579-722	-	11.48±0.12	0	11.8±0.7	photol. CF_3COCF_3	[10]	1203, 1235
$CF_3 + CHCl_3 = CF_3H +$ $+ CCl_3$	308-611	-	10.15	0	5.3±0.14	photol.+ pyr. CH_3NNCF_3	[11]	1203, 1236
	367-569	-	11.04±0.06	0	6.6±0.1	photol. CF_3COCF_3	[10]	1203
	390-524	-	10.98	0	6.3±0.6	"	[320]	1203, 1215
$CF_3 + CHCl_3 = CF_3Cl +$ $+ CHCl_2$	308-611	-	11.29_5 ± ± 0.18	0	11.0±0.4	photol. and pyr. CF_3NNCF_3	[11]	1203, 1236
	367-569	-	12.06_4±0.11	0	12.0±0.2	photol. CF_3COCF_3	[10]	1203, R
$CF_3 + CDCl_3 = CF_3D +$ $+ CCl_3$	338-537	-	11.78	0	9.0±0.4	photol. CF_3COCF_3	[320]	1203, 1215
$CF_3 + CCl_4 = CF_3Cl +$ $+ CCl_3$	369-513	-	12.56_4±0.04	0	10.4±0.1	photol. CF_3COCF_3	[10]	1203, R
	364-561	-	11.74±0.22	0	9.25± ±0.36	photol. CF_3NNCF_3	[11]	1203, 1236
$CF_3 + C_6H_5Cl = CF_3H +$ $+ C_6H_4Cl$	293-391	-	10.55	0	5.5±0.3	photol. CF_3COCF_3	[628]	1203
$CF_3 + C_6H_5Cl = CF_3Cl +$ $+ C_6H_5$	293-391	-	-	0	≥ 13	photol. CF_3COCF_3	[628]	
$CF_3 + C_6H_5CH_2Cl = CF_3H+$ $+ C_6H_5CHCl$	340-424	-	12.46	0	8.0±0.3	photol. CF_3COCF_3	[628]	1203
$CF_3 + C_6H_5CH_2Cl =$ $= CF_3Cl + C_6H_5CH_2$	340-424	-	-	0	≥ 13	photol. CF_3COCF_3	[628]	
$CF_3 + C_6H_5CCl_3 =$ $= CF_3H + C_6H_4CCl_3$	377-444	-	12.55	0	8.8±0.6	photol. CF_3COCF_3	[628]	1203
$CF_3 + C_6H_5CCl_3 =$ $= CF_3Cl + C_6H_5CCl_2$	377-444	-	12.49	0	9.7±0.6	photol. CF_3COCF_3	[628]	1203

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CF_3 + CH_3Br = CF_3H + CH_2Br$	423-533	-	12.16±0.14	0	10.9±0.3	photol. CF_3COCF_3	[9]	1203, 1237
	"	-	11.62_5 ± 0.07	0	9.9±0.1	"	"	1203, 1238
$CF_3 + CH_3Br = CF_3Br + CH_3$	423-533	-	10.82±0.06	0	8.4±0.1	photol. CF_3COCF_3	[9]	1203, 1237
	"	-	10.39_5±0.11	0	8.1±0.2	"	"	1203, 1238
$CF_3 + C_6H_5Br = CF_3H + C_6H_4Br$	296-368	-	11.52_4	0	5.9±0.5	photol. CF_3COCF_3	[628, 334]	1203
$CF_3 + C_6H_5Br = CF_3Br + C_6H_5$	296-368	-	7.91	0	1.7±1.1	photol. CF_3COCF_3	[628, 334]	1203
$CF_3 + C_6F_5Br = CF_3Br + C_6F_5$	312-380	-	7.38	0	0.3±0.6	photol. CF_3COCF_3	[628, 334]	1203
$CF_3 + CH_3I = CF_3H + CH_2I$	328-483	-	10.60±0.17	0	7.5±0.3	photol. CF_3COCF_3	[9]	1203
$CF_3 + CH_3I = CF_3I + CH_3$	328-483	-	9.59±0.09	0	3.3±0.15	photol. CF_3COCF_3	[9]	1203
$CF_3 + C_6H_5I = CF_3H + C_6H_4I$	348-423	-	10.75_6	0	4.5±0.1	photol. CF_3COCF_3	[628]	1203
$CF_3 + C_6H_5I = CF_3I + C_6H_5$	348-423	-	10.33	0	3.1±0.6	photol. CF_3COCF_3	[628]	1203
$CF_3 + Si(CH_3)_4 = CF_3H + CH_2Si(CH_3)_3$	453	8.54	-	-	-	photol. $(CF_3N)_2$	[337]	1239
$CF_3 + ClSi(CH_3)_3 = CF_3H + ClCH_2Si(CH_3)_2$	453	8.16	-	-	-	photol. $(CF_3N)_2$	[337]	1239
$CF_3 + Cl_2Si(CH_3)_2 = CF_3H + Cl_2CH_2SiCH_3$	453	7.64	-	-	-	photol. $(CF_3N)_2$	[337]	1239
$CF_3 + Cl_3SiCH_3 = CF_3H + Cl_3SiCH_2$	453	6.86	-	-	-	photol. $(CF_3N)_2$	[337]	1239

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CF_3 + NO \rightarrow CF_3NO$	297	≥ 11.04	-	-	-	photol. CF_3COCF_3	[1532]	1203
$CF_3 + CH_3 \rightarrow CH_3CF_3$	296-513	-	-	-	-	photol. $(CF_3)_2CO$	[627]	886
$CF_3 + C_2H_4 \rightarrow C_3H_4F_3$	338-456	-	11.78	0	2.35	photol. $(CF_3N)_2$	[1224]	1240
$CF_3 + C_3H_6 \rightarrow C_4H_6F_3$	338	-	-	-	-	photol. $(CF_3N)_2$	[467]	1241
	338-453	-	11.60	0	1.94	"	[1224]	1240
$CF_3 + (CH_3)_2C{=}CH_2 \rightarrow$ $\rightarrow C_5H_8F_3$	338	-	-	-	-	photol. $(CF_3N)_2$	[467]	1242
	338-453	-	11.58	0	1.18	"	[1224]	1240
$CF_3 +$ cis-$CH_3CHCHCH_3 \rightarrow$ $\rightarrow C_5H_8F_3$	338-453	-	11.02	0	1.25	photol. $(CF_3N)_2$	[1210]	1240
$CF_3 +$ trans-$CH_3CHCHCH_3$ $\rightarrow C_5H_8F_3$	338-453	-	11.02	0	1.24	photol. $(CF_3N)_2$	[1210]	1240
$CF_3 + (CH_3)_2CC(CH_3)_2 \rightarrow$ $\rightarrow C_7H_{12}F_3$	338	-	-	-	-	photol. $(CF_3N)_2$	[467]	1243
	338-453	-	10.72	0	0.75	"	[1210]	1240
$CF_3 +$ butadiene $\rightarrow$ $\rightarrow C_5H_6F_3$	338	-	-	-	-	photol. $(CF_3N)_2$	[467]	1244
	338-448	-	11.87	0	0.92	"	[1224]	1240
$CF_3 + H_2C{=}CCH_3{-}CH{=}CH_2$ (isoprene) $\rightarrow C_5H_8CF_3$	338-453	-	11.85	0	0.65	photol. $(CF_3N)_2$	[1224]	1240
$CF_3 +$ 2,3-dimethyl-1,3-butadiene $\rightarrow C_7H_{10}F_3$	338-453	-	11.80	0	0.28	photol. $(CF_3N)_2$	[1224]	1240
$CF_3 +$ 2,4-hexadiene $\rightarrow$ $\rightarrow C_7H_{10}F_3$	338-453	-	11.12	0	0	photol. $(CF_3N)_2$	[1210]	1240
$CF_3 + C_2H_2 \rightarrow C_3H_2F_3$	338-453	-	12.32	0	4.2	photol. $(CF_3N)_2$	[1210]	1240
$CF_3 + CH_3CCH \rightarrow C_4H_4F_3$	338-453	-	12.29	0	3.6	photol. $(CF_3N)_2$	[1210]	1240

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CF_3 + CH_3CCCH_3 \rightarrow$ $\rightarrow C_5H_6F_3$	338-453	-	11.87	0	3.4	photol. $(CF_3N)_2$	[1210]	1240
CF_3 + cyclopentene $\rightarrow$ $\rightarrow C_6H_8F_3$	338-453	-	11.50	0	2.2	photol. $(CF_3N)_2$	[1210]	1240
	338	-	-	-	-	"	[467]	1245
CF_3 + cyclohexene $\rightarrow$ $\rightarrow C_7H_{10}F_3$	356-453	-	11.50	0	2.6	photol. $(CF_3N)_2$	[1210]	1240
$CF_3 + C_6H_6 \rightarrow CF_3C_6H_6$	296-359	-	12.15±0.10	0	5.44±0.24	photol. CF_3COCF_3	[335, 334]	1203, 1246
	296-375	-	11.55±0.24	0	4.4±0.4	"	[794]	1225
	300-383	-	-	0	4.6±0.5	photol. $(CF_3)_2CO$	[793]	
	338	-	-	-	-	photol. $(CF_3N)_2$	[467]	1247
	338-423	-	11.34	0	4.4	"	[1210]	1240
$CF_3 + C_6H_5CH_3 \rightarrow$ $\rightarrow CF_3C_6H_5CH_3$	298-354	-	11.93±0.18	0	4.90±0.23	photol. CF_3COCF_3	[335, 334]	1203,1246
	298-383	-	11.32±0.18	0	3.6±0.3	"	[794]	1225
	300-383	-	-	0	3.5±0.5	photol. CF_3COCF_3	[793]	
CF_3 + ortho- xylene $\rightarrow$ $\rightarrow CF_3CH_3C_6H_4CH_3$	310-341	-	11.91±0.34	0	4.35±0.34	photol. CF_3COCF_3	[335, 334]	1203
$CF_3 + C_6H_5CH{=}CH_2$ (styrene) $\rightarrow C_6H_5C_2H_3CF_3$	338-423	-	11.81	0	1.25	photol. $(CF_3N)_2$	[1224]	1240
CF_3 + a-methylstyrene $\rightarrow$ $\rightarrow C_6H_5CCH_3CH_2CF_3$	338-448	-	11.75	0	0.84	photol. $(CF_3N)_2$	[1224]	1240
$CF_3 + C_6H_5CCH \rightarrow$ $\rightarrow C_9H_6F_3$	358-453	-	12.05	0	2.5	photol. $(CF_3N)_2$	[1210]	1240
CF_3 + pyridine $\rightarrow$ $\rightarrow C_5H_5NCF_3$	368-453	-	~11.07	0	4.4	photol. $(CF_3N)_2$	[1210]	1240
CF_3 + anisole $\rightarrow$ $\rightarrow CF_3C_6H_5OCH_3$	338	8,91	-	-	-	photol. CF_3COCF_3	[334]	1203

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CF_3 + CF_3 + Ar =$ $= C_2F_6 + Ar$	1800–2200	-	17.85	1/2	0	shock	[1133]	
$CF_3 + CF_3 \rightarrow C_2F_6$	302–442	-	-	0	2.14	photol. CF_3COCF_3+ CH_3COCH_3	[1264]	1248
	400	13.36	-	-	-	photol. CF_3COCF_3 rot. sect.	[61]	
$CF_3 + C_2F_4 \rightarrow C_3F_7$	338–453	-	11.12	0	2.8	photol. $(CF_3N)_2$	[1210]	1240
$CF_3 + C_2F_5 \rightarrow C_3F_8$	357–557	-	-	-	-	photol.	[1147]	1249
	373–573	-	-	-	-	"	[648]	957
CF_3 + n-$C_3F_7 \rightarrow C_4F_{10}$	373–480	-	-	-	-	photol. $(CF_3)_2CO$	[1270]	1250
$CF_3 + C_2H_3F \rightarrow C_3H_3F_4$	338	-	-	-	-	photol. $(CF_3N)_2$	[467]	1251
	338–453	-	11.61	0	3.68	"	[1224]	1240
CF_3 + 2-fluoropropene $\rightarrow$ $\rightarrow CF_3CH_3CFCH_2$	338	-	-	-	-	photol. $(CF_3N)_2$	[467]	1252
$CF_3 + C_6H_5F \rightarrow$ $\rightarrow CF_3C_6H_5F$	302–396	-	10.77±0.05	0	4.0±0.1	photol. CF_3COCF_3	[334]	1203
CF_3 + ortho-$C_6H_4F_2 \rightarrow$ $\rightarrow CF_3C_6H_4F_2$	300–400	-	11.04_5±0.12	0	4.7±0.3	photol. CF_3COCF_3	[334]	1203, 1253
CF_3 + meta-$C_6H_4F_2 \rightarrow$ $\rightarrow CF_3C_6H_4F_2$	300–400	-	10.99_5± ±0.23_5	0	4.9±0.4	photol. CF_3COCF_3	[334]	1203, 1253
CF_3 + para-$C_6H_4F_2 \rightarrow$ $\rightarrow CF_3C_6H_4F_2$	300–400	-	10.70±0.13	0	4.1±0.2	photol. CF_3COCF_3	[334]	1203, 1253
CF_3 + 1,2,4-$C_6H_3F_3 \rightarrow$ $\rightarrow CF_3C_6H_3F_3$	300–400	-	10.90±0.10	0	5.0±0.2	photol. CF_3COCF_3	[334]	1203, 1253
CF_3 + 1,3,5-$C_6H_3F_3 \rightarrow$ $\rightarrow CF_3C_6H_3F_3$	300–400	-	10.34±0.14	0	4.5±0.2	photol. CF_3COCF_3	[334]	1203, 1253

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CF_3 + 1,2,3,4\text{-}C_6H_2F_4 \rightarrow$ $\rightarrow CF_3C_6H_2F_4$	300–400	-	11.27±0.20	0	5.8±0.3	photol. CF_3COCF_3	[334]	1203, 1253
$CF_3 + 1,2,4,5\text{-}C_6H_2F_4 \rightarrow$ $\rightarrow CF_3C_6H_2F_4$	300–400	-	10.17±0.15	0	4.1±0.2	photol. CF_3COCF_3	[334]	1203, 1253
$CF_3 + C_6HF_5 \rightarrow$ $\rightarrow CF_3C_6HF_5$	300–400	-	10.66±0.11	0	5.1±0.2	photol. CF_3COCF_3	[334]	1203, 1253
$CF_3 + C_6F_6 \rightarrow CF_3C_6F_6$	300–400	-	11.00±0.11	0	5.8±0.2	photol. CF_3COCF_3	[334]	1203, 1253
	358–453	-	11.28	0	6.5	photol.$(CF_3N)_2$	[1210]	1240, R
$CF_3 + C_6H_5CF_3 \rightarrow$ $\rightarrow CF_3C_6F_5CF_3$	300–400	-	11.78±0.20	0	5.8±0.2	photol. CF_3COCF_3	[334]	1203, 1253
$CF_3 + C_6F_5CH_3 \rightarrow$ $\rightarrow CF_3C_6F_5CH_3$	300–400	-	9.93±0.13	0	3.7±0.2	photol. CF_3COCF_3	[334]	1203, 1253
$CF_3 + C_6F_5CF_3 \rightarrow$ $\rightarrow CF_3C_6F_5CF_3$	300–400	-	10.27_5±0.13	0	4.6±0.2	photol. CF_3COCF_3	[334]	1203,1253
CF_3 + para-$CF_3C_6F_4CF_3 \rightarrow$ $\rightarrow CF_3CF_3C_6F_4CF_3$	300–400	-	9.32±0.29	0	4.2±0.2	photol. CF_3COCF_3	[334]	1203,1253
$CF_3 + CF_3NNCF_3 \rightarrow$ $\rightarrow (CF_3)_2NNCF_3$	203–373	-	10.16	0	3.5±0.2	photol.$(CF_3N)_2$	[1272]	1203
$CF_3 + (CF_3)_2NNCF_3 \rightarrow$ $\rightarrow [(CF_3)_2N]_2$	278–310	-	-	-	-	photol.	[426]	
$CF_3 + CF_3COCF_3 \rightarrow$ $\rightarrow (CF_3)_2COCF_3$	372–500	-	-	0	9.67±0.26	photol. $(CF_3)_2CO$	[646]	
$CF_3 + CCl_3 \rightarrow CF_3CCl_3$	405–569	-	-	-	-	photol. $(CF_3)_2CO$	[10]	1254
$CF_3 + C_2H_3Cl \rightarrow$ $\rightarrow C_3H_3F_3Cl$	338	-	-	-	-	photol. $(CF_3N)_2$	[467]	1255

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	338–453	-	11.80	0	2.86	photol. $(CF_3N)_2$	[1224]	1240
$CF_3 + Cl_2CCH_2 \rightarrow$ $\rightarrow C_3H_2F_3Cl_2$	338–453	-	11.46	0	1.9	photol. $(CF_3N)_2$	[1210]	1240
$CF_3 +$ cis–ClHCCHCl $\rightarrow$ $\rightarrow C_3H_2F_3Cl_2$	338–453	-	11.20	0	4.2	photol. $(CF_3N)_2$	[1210]	1240
$CF_3 +$ trans–ClHCCHCl $\rightarrow$ $\rightarrow C_3H_2F_3Cl_2$	338–453	-	11.02	0	3.4	photol. $(CF_3N)_2$	[1210]	1240
$CF_3 + F_2CCCl_2 \rightarrow$ $\rightarrow C_3F_5Cl_2$	338–453	-	10.72	0	3.0	photol. $(CF_3N)_2$	[1210]	1240
$CF_3 + C_2Cl_4 \rightarrow$ $\rightarrow C_3F_3Cl_4$	353 and 393	-	11.32	0	5.5	photol. $(CF_3N)_2$	[1210]	1240
$CF_3 + C_6H_5Cl \rightarrow$ $\rightarrow CF_3C_6H_5Cl$	293–391	-	11.28±0.23	0	4.4±0.1	photol. CF_3COCF_3	[628]	1203
$CF_3 + C_6H_5CH_2Cl \rightarrow$ $\rightarrow CF_3C_6H_5CH_2Cl$	340–424	-	10.70±0.13	0	3.5±0.2	photol. CF_3COCF_3	[628]	1203
$CF_3 + C_6H_5CCl_3 \rightarrow$ $\rightarrow CF_3C_6H_5CCl_3$	377–444	-	11.44±0.08	0	5.0±0.2	photol. CF_3COCF_3	[628]	1203
$CF_3 + C_6F_5Cl \rightarrow$ $\rightarrow CF_3C_6F_5Cl$	295–384	-	10.81±0.13	0	5.2±0.3	photol. CF_3COCF_3	[628]	1203
$CF_3 + C_6H_5Br \rightarrow$ $\rightarrow CF_3C_6H_5Br$	296–368	-	11.52±0.54	0	4.8±0.8	photol. CF_3COCF_3	[628, 334]	1203
$CF_3 + C_6F_5Br \rightarrow$ $\rightarrow CF_3C_6F_5Br$	312–380	-	10.76±0.38	0	5.3±0.6	photol. CF_3COCF_3	[628, 334]	1203
$CF_3 + Ar = CF_2 + F +$ $+ Ar$	1800–2200	-	49.2	-9.04	92.25	shock	[1133]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_2F_5 + H_2 = C_2F_5H + H$	300–450	-	12.92	0	12.4	photol. C_2F_5CHO	[975]	1256
	410–510	-	12.72	0	11.90	photol. $(C_2F_5)_2CO$	[1259]	1257,1206
	419–586	-	13.20±0.04	0	12.4±0.2	photol. C_2F_5CHO	[1266]	1257
	300–590	-	13.31±0.27	0	12.95±0.51	-	-	1258
$C_2F_5 + D_2 = C_2F_5D + D$	300–580	-	12.30	0	12.4±0.3	photol. C_2F_5CHO	[1271]	1257
	408–612	-	12.45±0.05	0	12.6±0.2	"	[1266]	"
	426–531	-	13.1	0	14.1	photol. $(C_2F_5N)_2$	[1265]	1256, 1259
$C_2F_5 + Br_2 = C_2F_5Br + Br$	622–744	-	-	0	1 ± 1	therm.	[25]	
$C_2F_5 + HBr = C_2F_5H + Br$	622–744	-	-	0	3.9±1.2	therm.	[25]	1260
$C_2F_5 + CH_4 = C_2F_5H + CH_3$	423–545	-	11.62	0	10.62	photol. $(C_2F_5)_2CO$	[1259]	1257,1206
	426–531	-	11.64	0	10.6	photol. $(C_2F_5N)_2$	[1265]	1256
$C_2F_5 + C_2H_6 = C_2F_5H + C_2H_5$	357–499	-	11.20	0	8.7	photol. $(C_2F_5N)_2$	[1265]	1256
C_2F_5 + cyclohexane = C_2F_5H + cyclo-C_6H_{11}	301–405	-	11.20	0	6.0	photol. $(C_2F_5N)_2$	[1265]	1256
$C_2F_5 + CH_3COCH_3 = C_2F_5H + CH_2COCH_3$	355–492	-	11.73	0	8.4	photol. $(C_2F_5N)_2$	[1265]	1256
$C_2F_5 + CF_3CHO = C_2F_5H + CF_3CO$	411–498	-	11.42	0	9.7	photol. $(C_2F_5N)_2$	[1265]	1256
$C_2F_5 + C_2F_5CHO = C_2F_5H + C_2F_5CO$	300–580	-	10.47±0.04	0	4.5±0.2	photol. C_2F_5CHO	[1271, 1266]	1257
	411–493	-	10.50	0	4.5	photol. $(C_2F_5N)_2$	[1265]	1256
	419–586	-	10.72±0.12	0	4.9±0.2	photol.	[1266]	1257
$C_2F_5 + C_2H_5COC_2F_5 = C_2F_5H + C_2H_4COC_2F_5$	411–498	-	11.36	0	5.6	photol. $(C_2F_5N)_2$	[1265]	1256

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_3F_7 + H_2 = C_3F_7H + H$	430-592	-	12.85±0.07	0	12.1±0.2	photol. C_3F_7CHO	[1266]	1261
	398-516	-	12.64	0	12.3±0.4	photol. $(n\text{-}C_3F_7)_2CO$	[1123]	1261,1206
$C_3F_7 + D_2 = C_3F_7D + D$	358-455	-	12.69	0	12.9±0.8	photol. $(n\text{-}C_3F_7)_2CO$	[623]	1261,1206
	430-537	-	12.78	0	13.8±0.5	"	[1123]	"
	438-570	-	12.98±0.03	0	14.0±0.1	photol. C_3F_7CHO	[1266]	1261
	"	-	11.34	0	12.6±0.4	"	[1266, 1271]	1261
	360-570	-	12.22±0.44	0	12.29± ±0.905	-	-	1262
$C_3F_7 + CH_4 = C_3F_7H +$ $+ CH_3$	343-439	-	10.99	0	9.5±0.5	photol. $(n\text{-}C_3F_7)_2CO$	[623]	1261,1206
$C_3F_7 + C_2H_6 = C_3F_7H +$ $+ C_2H_5$	360-469	-	12.23	0	9.2±0.5	photol. $(n\text{-}C_3F_7)_2CO$	[623, 1267]	1261
$n\text{-}C_3F_7 +$ cyclo-C_6H_{12} = = $C_3F_7H +$ cyclo-C_6H_{11}	296-566	-	11.08	0	5.2±0.1	photol. $(n\text{-}C_3F_7)_2CO$	[1268]	1261
$C_3F_7 + CH_3COCH_3 =$ $= C_3F_7H + CH_2COCH_3$	300-579	-	11.79±0.18	0	7.2±0.4	photol. $(CH_3)_2CO +$ $+ (C_3F_7)_2CO$	[1267]	1261
$C_3F_7 + C_3F_7 \rightarrow$ $\rightarrow C_6F_{14}$	300-579	-	-	-	-	photol. $(CH_3)_2CO+$ $(C_3F_7)_2CO$	[1267]	1263
$C_3F_7 + C_3F_7CHO =$ $= C_3HF_7 + C_3F_7CO$	301-588	-	10.27±0.03	0	4.0±0.3	photol. C_3F_7CHO	[1271]	1261
	438-570	-	10.97±0.09	0	5.5±0.2	"	[1266]	"
	300-590	-	10.37±0.14	0	4.17±0.28	-	-	1258
$C_3F_7 + C_3F_7COC_2H_5 =$ $= C_3HF_7 + C_2H_4COC_3F_7$	353-635	-	11.74±0.18	0	8.4±0.3	photol. $C_3F_7COC_2H_5$	[1279]	820

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_2F + CH_2F = HF + CHFCH_2$	298	-	-	-	-	photol. $(CFH_2)_2CO$	[1282]	1264, 1674
	577	-	-	-	-	"	"	"
$CH_2F + CH_2FCOCH_3 = CH_3F + CHFCOCH_3$ и CH_2FCOCH_2	329–585	-	9.95	0	6.7	photol. CH_2FCOCH_3	[1281]	1265
$CH_2F + (CH_2F)_2CO = CH_3F + CHFCOCH_2F$	295–585	-	10.39	0	8.0±0.1	photol. $(CH_2F)_2CO$	[1282]	1266
$CHF_2 + CHF_2 = CH_2F_2 + CF_2$	393	-	-	-	-	Hg photo.	[136]	1054
$CHF_2 + (CHF_2)_2CO = CH_2F_2 + CF_2COCHF_2$	295–578	-	10.01	0	6.9	photol. $(CHF_2)_2CO$	[1260]	1267
$CH_2Cl + Cl_2 = CH_2Cl_2 + Cl$	-	-	12.6	0	3.0	photo-Cl_2	[499]	
$CH_2Cl + HCl = CH_3Cl + Cl$	-	-	12.3	0	7.8	photo-Cl_2	[499]	
$CH_2Cl + CH_2Cl \rightarrow C_2H_4Cl_2$	-	-	12.6	0	0	photo-Cl_2	[499]	
$CHCl_2 + Cl_2 = CHCl_3 + Cl$	-	-	12.0	0	4.0	photo-Cl_2	[499]	
$CHCl_2 + HCl = CH_2Cl_2 + Cl$	-	-	12.2	0	11.0	photo-Cl_2	[499]	
$CHCl_2 + CHCl_2 \rightarrow C_2H_2Cl_4$	-	-	12.4	0	0	photo-Cl_2	[499]	
$CCl_3 + Cl_2 = CCl_4 + Cl$	303–425	-	11.74	0	5.0	photo-Cl_2	[452]	
	343–428	-	-	-	-	"	[348]	1268
	345	8.55	-	-	-	photochem.	[451]	
	360–430	-	-	-	-	photo-Cl_2	[347]	1269
$CCl_3 + Br_2 = CCl_3Br + Br$	420–455	-	-	-	-	therm.	[1458]	1270

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CCl_3 + HCl = CHCl_3 + Cl$	303–425	-	11.65	0	11.3	photo-Cl_2, from k_- and K	[452]	
$CCl_3 + HCl = CCl_4 + H$	303–425	-	12.1	0	13.3	photo-Cl_2	[499]	
$CCl_3 + HBr = CHCl_3 + Br$	463	11.44±0.63	-	-	-	photochem.	[1481]	1271
$CCl_3 + CH_3CHCH_2 = CHCl_3 + CH_2CHCH_2$	395–483	-	~12	0	~6.3	photol. CCl_3Br	[1480]	
$CCl_3 + n\text{-}C_4H_{10} = CHCl_3 + CH_2CH_2CH_2CH_3$	419–530	-	10.58	0	11.2	photol. CCl_3Br	[1481]	1271, 1272, 1273
$CCl_3 + n\text{-}C_4H_{10} = CHCl_3 + CH_3CHCH_2CH_3$	419–530	-	10.2	0	7.5	photochem.	[1481]	1271, 1272, 1273
$CCl_3 + C_2H_4Cl = CHCl_3 + C_2H_3Cl$	299–383	-	-	-	-	photol. CCl_4	[1336]	1274
	-	-	-	-	-	-	[1337]	
$CCl_3 + CH_3CFCH_2 = CHCl_3 + CH_2CFCH_2$	362–454	-	~12	0	~6.6	photol. CCl_3Br	[1480]	
$CCl_3 + CH_2FCH_2CH_2CH_3 = CHCl_3 + CHFC_3H_7$	437–532	-	10.5	0	9.4	photol. CCl_3Br	[1478,1482]	1275,1276
$CCl_3 + CH_2FCH_2CH_2CH_3 = CHCl_3 + CH_2FCHCH_2CH_3$	453–532	-	11.9	0	(13.2)	photol. CCl_3Br	[1482]	1276,1277
$CCl_3 + CH_2FCH_2CH_2CH_3 = CHCl_3 + CH_2FCH_2CHCH_3$	-	-	10.2	0	7.5	est.	[1482,1478]	1276
$CCl_3 + CH_2FCH_2CH_2CH_3 = CHCl_3 + CH_2FCH_2CH_2CH_2$	445–532	-	10.98	0	11.4	photol. CCl_3Br	[1482,1478]	1276
$CCl_3 + CF_3CH_2CH_2CH_2CH_3 = CHCl_3 + CF_3CHCH_2CH_2CH_3$	420–504	-	9.8	0	9.6	photol. CCl_3Br	[1482,1478]	1276
$CCl_3 + CF_3CH_2CH_2CH_2CH_3 = CHCl_3 + CF_3CH_2CHCH_2CH_3$	418–504	-	10.4	0	9.1	photol. CCl_3Br	[1482,1478]	1276

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CCl_3 + CF_3CH_2CH_2CH_2CH_3 = CHCl_3 + CF_3CH_2CH_2CHCH_3$	-	-	10.2	0	7.5	est.	[1482, 1478]	1276
$CCl_3 + CF_3CH_2CH_2CH_2CH_3 = CHCl_3 + CF_3CH_2CH_2CH_2CH_2$	418-504	-	10.78	0	11.7	photol. CCl_3Br	[1482, 1478]	1276
$CCl_3 + CCl_3COCCl_3 = CCl_4 + CCl_2COCCl_3$	380-525	-	11.39	0	7 ± 1	photol. $(CCl_3)_2CO$	[735]	1278
$CCl_3 + C_2H_4 \rightarrow C_3H_4Cl_3$	331-451	-	8.62	0	3.24	photochem.	[1475]	1271
	367-450	-	8.6±0.3	0	3.2±0.3	photol. CCl_3Br	[1477]	"
$CCl_3 + C_2H_5 \rightarrow C_2H_5CCl_3$	273-331	-	-	-	-	photol. CCl_4	[1337]	1279
	299-383	-	-	-	-	"	[1336]	1280
$CCl_3 + CH_3CHCH_2 \rightarrow CH_3CHCH_2CCl_3$	421-483	-	10.2	0	3.4±1.5	photol. CCl_3Br	[1480]	
$CCl_3 + CH_3CHCH_2 \rightarrow CH_3CHCH_2CCl_3$	303-323	-	7.86	0	3.4	photol. CCl_3Br	[1107]	1281
CCl_3 + cyclohexane $\rightarrow C_7H_{10}Cl_3$	303-323	-	7.86	0	3.4	photol. CCl_3Br	[1107]	1281
CCl_3 + vinyl acetate $\rightarrow CH_2COOCHCH_2CCl_3$	303-323	-	10.4	0	6.1	photol. CCl_3Br	[1107]	
	303	6.05	-	-	-	"	[1107]	
$CCl_3 + CCl_3 \rightarrow C_2Cl_6$	303 and 318	-	10.7	0	0	photol., int. ill.	[1107]	
	303-425	-	12.66	0	0	photo-Cl_2	[452, 451]	
	345	12.62	-	-	-	photochem.	[451]	1282
	350-446	-	13.9	0	0	photol. CCl_3Br	[1479]	
	448	13.5	-	-	-	photol. CCl_3Br	[1476]	
	-	-	11.8	0	0	est.	[499]	1283
$CCl_3 + C_2H_3F \rightarrow CCl_3CH_2CHF$	337-460	-	8.5±0.2	0	3.3±0.2	photol. CCl_3Br	[1477]	1271

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CCl_3 + C_2H_3F \rightarrow$ $\rightarrow CCl_3CHFCH_2$	377-460	-	8.4±0.2	0	5.3±0.2	photol. CCl_3Br	[1477]	1271
$CCl_3 + C_2H_2F_2 \rightarrow$ $\rightarrow CCl_3CH_2CF_2$	344-455	-	8.7±0.3	0	4.6±0.3	photol. CCl_3Br	[1477]	1271
$CCl_3 + C_2H_2F_2 \rightarrow$ $\rightarrow CH_2CF_2CCl_3$	405-465	-	8.5±0.3	0	8.3±0.5	photol. CCl_3Br	[1477]	1271
$CCl_3 + C_2HF_3 \rightarrow$ $\rightarrow CCl_3CHFCF_2$	367-465	-	9.3±0.4	0	6.1±0.8	photol. CCl_3Br	[1477]	1271
$CCl_3 + C_2HF_3 \rightarrow$ $\rightarrow CHFCF_2CCl_3$	367-465	-	9.4±0.4	0	7.1±0.7	photol. CCl_3Br	[1477]	1271
$CCl_3 + C_2F_4 \rightarrow$ $\rightarrow CCl_3C_2F_4$	345-452	-	10.1±0.5	0	6.1±0.4	photol. CCl_3Br	[1477]	1271
$CCl_3 + C_2H_4Cl \rightarrow$	273-331	-	-	-	-	photol. CCl_4	[1337]	1284
$\rightarrow CCl_3C_2H_4Cl$	299-383	-	-	-	-	"	[1336]	1285
$CCl_3 + CH_3CFCH_2 \rightarrow$ $\rightarrow CH_3CFCH_2CCl_3$	362-454	-	9.8	0	3.2±0.8	photol. CCl_3Br	[1480]	
$CCl_3 + CH_3CFCH_2 \rightarrow$ $\rightarrow CCl_3CH_3CFCH_2$	362-454	-	~10.4	0	6.4±2.0	photol. CCl_3Br	[1480]	
$CCl_3 + CF_3CFCF_2 \rightarrow$ $\rightarrow CF_3CFCF_2CCl_3$	415-485	-	9.5	0	6.2±0.9	photol. CCl_3Br	[1480]	
$CCl_3 + C_6H_{10}CCl_3 \rightarrow$ $\rightarrow C_6H_{10}(CCl_3)_2$	303	11.45	-	-	-	photol. CCl_3Br	[1107]	
$CCl_3 + C_4H_5O_2{\cdot}CCl_3 \rightarrow$ $\rightarrow C_4H_5O_2(CCl_3)_2$	303	12.28	-	-	-	photol. CCl_3Br	[1107]	
$CF_2Cl +$ cyclo-C_5H_{10} = = $CHF_2Cl +$ cyclo-C_5H_9	300-373	-	-	0	5.3±0.4	photol. $(CF_2Cl)_2CO$	[1038]	1286

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CF_2Cl + CF_2Cl = CF_2Cl_2 + CF_2$	315-458	-	-	-	-	photol. $(CF_2Cl)_2CO$	[209]	1287
	418	-	-	-	-	Hg photo.	[136]	1288
$CF_2Cl + (CF_2Cl)_2CO = CF_2Cl_2 + CF_2COCF_2Cl$	305-520	-	-	-	7.9±1.1	photol. $(CF_2Cl)_2CO$	[1037]	
$CF_2Cl + CF_2ClCOCFCl_2 = CF_2Cl_2 + CF_2COCFCl_2$	313-457	-	-	0	3	photol. $CF_2ClCOCFCl_2$	[210]	1286
$CF_2Cl + C_6H_6 \rightarrow CF_2ClC_6H_6$	300-375	-	-	0	5.3±0.4	photol. $(CF_2Cl)_2CO$	[1037, 1038]	1286
$CF_2Cl + CF_2H \rightarrow CF_2HCF_2Cl$	≥393	-	-	-	-	Hg photo.	[136]	1289
$CF_2Cl + CFCl_2 \rightarrow C_2F_3Cl_3$	293-457	-	-	-	-	photol. CF_3COCCl_3	[210]	1290
$CF_2Cl + CF_2ClCF_2 \rightarrow CF_2ClCF_2CF_2Cl$	комн.	-	-	-	-	photol. $CF_2ClCOC_2F_4Cl$	[208]	1291
	315-458	-	-	-	-	photol. $(CF_2Cl)_2CO$	[209]	1291
$CF_2Cl + C_6F_6 \rightarrow CF_2ClC_6F_6$	298-450	-	-	0	2.4±0.4	photol. $(CF_2Cl)_2CO$	[1037]	1286
$CFCl_2 + CF_2ClCOCFCl_2 = CFCl_3 + CF_2COCFCl_2$ and $CFCl_3 + CFClCOCF_2Cl$	293-457	-	-	0	4.6	photol. $CFCl_2COCF_2Cl$	[210, 1478]	1286
$C_2H_4Cl + Cl_2 = C_2H_4Cl_2 + Cl$	-	-	12.4	0	1.0	photo-Cl_2	[499]	1292
$C_2H_4Cl + HCl = C_2H_5Cl + Cl$	-	-	12.0	0	9.1	photo-Cl_2	[346, 499]	
$C_2H_4Cl + C_2H_4Cl = C_2H_5Cl + C_2H_3Cl$	299-383	-	-	-	-	photol. CCl_4	[1336]	1293

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_2H_4Cl + C_2H_4Cl =$ $= C_2H_4Cl_2 + C_2H_4$	299-383	-	-	-	-	photol. CCl_4	[1336]	1293
$C_2H_4Cl + C_2H_4Cl \rightarrow$ $\rightarrow$ products	-	-	13.1	0	0	photo-Cl_2	[346,499]	1292
$C_2H_4Cl \rightarrow C_2H_4 + Cl$	-	-	16.9	0	23.6	photo-Cl_2	[346,499]	
$C_2H_3Cl_2 + Cl_2 =$ $= C_2H_3Cl_3 + Cl$	298-328	-	11.75±0.2	0	0.92± ±0.05	photochem.	[65,431,64]	
	"	-	11.8	0	1.0	photo-Cl_2	[65,346,499]	1292
	313 and 333	-	-	-	-	photochem.	[1369]	1294
$C_2H_3Cl_2 + HCl =$ $= C_2H_4Cl_2 + Cl$	-	-	11.9	0	10.2	photo-Cl_2	[346,499]	
$C_2H_3Cl_2 + C_3H_6 =$ $= C_2H_4Cl_2 + C_3H_5$ or $C_2H_3Cl + HCl + C_3H_5$	650-740	-	9.63	0	8.0	pyr. $(CH_2Cl)_2$	[803]	
	710-753	-	9.67	0	8.0	"	[106]	
$C_2H_3Cl_2 + C_2H_3Cl_2 \rightarrow$ $\rightarrow$ products	298-328	-	12.9±0.2	0	0.3±0.1	photochem.	[65,431,64]	
	"	-	12.7	0	0	-	[65,431]	1295
	-	-	12.8	0	0	photo-Cl_2	[346,499]	
$C_2H_3Cl_2 \rightarrow C_2H_3Cl + Cl$	635-758	-	-	-	21.5	pyr. $(CH_2Cl)_2$	[106]	
	650-725	-	10	0	22	"	[803]	601
	-	-	16.8	0	23.8	photochem.	[346,499]	
$1,2\text{-}C_2H_2Cl_3 + Cl_2 =$ $= C_2H_2Cl_4 + Cl$	303-338	-	11.7±0.3	0	2.7±0.6	photochem.	[62,64]	
	353-368	-	-	0	3.1	"	[1162]	1296
	-	-	11.7	0	2.5	"	[65,346,499]	1292
$1,1\text{-}C_2H_2Cl_3 + Cl_2 =$ $= C_2H_2Cl_4 + Cl$	298-328	-	11.84±0.4	0	4.1±0.7	photochem.	[65]	1292
$C_2H_2Cl_3 + HCl =$ $= C_2H_3Cl_3 + Cl$	-	-	11.5	0	11.2	photo-Cl_2	[346,499]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
1,2-$C_2H_2Cl_3$ +	303-338	-	13.5±0.3	0	0.5±0.5	photochem.	[62, 64]	
+ 1,2-$C_2H_2Cl_3$ = $C_2H_2Cl_2$+	"	-	13.2	0	0	-	[65]	1295
+ $C_2H_2Cl_4$ or $C_4H_4Cl_6$	-	-	12.5	0	0	photo-Cl_2	[346, 499]	
1,1-$C_2H_2Cl_3$ + 1,1-$C_2H_2Cl_3$ → products	298-328	-	13.02±0.6	0	1.2±0.7	photochem.	[62, 65]	1295
$C_2H_2Cl_3$ → $C_2H_2Cl_2$ + Cl	-	-	16.7	0	20.3	photo-Cl_2	[346, 499]	
C_2HCl_4 + Cl_2 = C_2HCl_5 +	353-388	-	-	0	5.3	photochem.	[1163]	1297, 1298
+ Cl	363-419	-	11.68	0	5.12	"	[343]	1299, 1300
	-	-	11.8	0	5.2	"	[346, 65]	1292
	353-413	-	11.74	0	5.15	photol. Cl_2	[430, 814, 64]	
	"	-	11.45	0	5.1±0.2	"	[430]	1301
	373-497	-	11.73	0	5.18	"	[814]	1300, R
C_2HCl_4+ C_2HCl_4 =	298-328	-	12.9±0.2	0	0.3±0.1	photochem.	[431]	
C_2HCl_5 + C_2HCl_3 or	353-413	-	12.48±0.28	0	0.5±0.2	photol. Cl_2	[430]	
$C_4H_2Cl_8$								
	353-413	-	12.56	0	0.5	photol. Cl_2	[499, 64]	186
	371	12.3	-	-	-	photo-Cl_2	[452]	
C_2HCl_4 + O_2 → $C_2HCl_4O_2$	363-403	-	11	0	0	photochem.	[812a]	908
C_2HCl_4 + $C_2HCl_4O_2$ → → $C_2HCl_4O_2C_2HCl_4$	363-403	-	13	0	0	photochem.	[812a]	908
C_2HCl_4 → C_2HCl_3 + Cl	433-497	-	13.7±0.5	0	20.4±1.0	photochem.	[814]	
C_2Cl_5 + Cl_2 = C_2Cl_6 +	353and 373	-	-	0	7.4	photochem.	[1373, 456]	1302
+ Cl	358-473	-	11.06	0	3.0±0.5	"	[7, 3]	1303, 1304
	360-420	-	10.12±0.7	0	3.71	"	[5, 2, 348]	
	360-520	-	11.31	0	5.42	photochem., stat.	[495]	R
C_2Cl_5 + HCl = C_2HCl_5 + + Cl	385-490	-	11.1	0	10.8	photo-Cl_2	[636, 346, 499]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_2Cl_5 + C_2Cl_5 = C_2Cl_6 +$	360–420	-	12.2	0	1.37	photochem.	[2]	
$+ C_2Cl_4$ or C_4Cl_{10}	360–520	-	11.66	0	0.08	photochem., stat.	[495, 346]	R
	373	11.37±0.3	-	-	-	photochem.	[5]	
$C_2Cl_5 + O_2 \rightarrow C_2Cl_5O_2$	353–373	-	11	0	0	photochem., est.	[895]	
$C_2Cl_5 + C_2Cl_5O_2 \rightarrow$ $\rightarrow C_2Cl_5O_2C_2Cl_5$	353 and 373	-	~12.9	0	0	photol. Cl_2, est.	[815]	
$C_2Cl_5 \rightarrow C_2Cl_4 + Cl$	360–420	-	16.3±0.8	-	-	photochem.	[5]	
	"	-	16.5	0	22.2	"	[2]	
	360–475	-	15.8	0	16.8	"	[636, 7, 499]	
	385–490	-	15.8	0	16.2	"	[636]	R
	413–473	-	-	-	-	"	[6]	
$C_2H_2Br + Br_2 = C_2H_2Br_2 +$	333–393	-	-	0	~5	photochem.	[1164]	1305
$+ Br$	"	-	-	-	-	"	[1164, 1165]	1306
$C_2H_2Cl_2Br + Br_2 =$ $= C_2H_2Cl_2Br_2 + Br$	363–403	-	-	0	~5	photochem.	[1166]	
$C_2H_2Cl_2Br \rightarrow C_2H_2Cl_2 +$ $+ Br$	363–403	-	-	0	11	photochem.	[1166]	1307
$C_2F_4Br + HBr =$ $= C_2F_4Br_2 + H$	970–1300	-	13.07	0	51.3	comp.	[1409]	
$C_2F_4Br \rightarrow C_2F_4 + Br$	970–1300	-	13.0	0	50	comp.	[1409]	
$C_3H_4Cl_3 + CCl_3Br =$ $= CCl_3C_2H_4Br + CCl_3$	331–451	-	~8	0	3.4	photochem.	[1475]	1308
CCl_3- cyclohexene +	303	4.80_4	-	-	-	photol. CCl_3Br	[1107]	
$+ CCl_3Br = CCl_3Br$- cyclo- hexene $+ CCl_3$	303–323	-	8.06	0	4.5	"	"	
$2CCl_3$- cyclohexene = $= (CCl_3$- cyclohexene $)_2$	303	10.3	-	-	-	photol. CCl_3Br	[1107]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$NH + NH = N_2 + H_2 +$	room?	14.84_5	-	-	-	radiol. NH_3	[1095]	1309
$+ 162 \pm 6$	2000	~14	-	-	-	shock	[457]	1310
$NH + NH_3 = 2NH_2 -$ $- 14 \pm 6$	2000	12.58	-	-	-	shock, from k_- and K	[457]	1310
$NH + N_2H_4 = NH_2 +$ $+ N_2H_3$	750–1000	-	14.0	0	10.0	therm., flow	[497]	
$NH + O_2 = NO + OH$	room?	-	-	-	-	radiol. NH_3	[1095]	1311
$NH + OH = NO + H_2$	-	-	13.2	0.56	1.5	calc.	[1288]	
$NH + OH = H_2O + N$	-	-	12.2	0.56	1.5	calc.	[1288]	
	-	-	11.7	1/2	2.0	est.	"	
$NH + N_2O = HNO + N_2$	-	-	11.0	1/2	3.0	est.	[1288]	
$NH + NO_2 = HNO + NO$	-	-	11.3	1/2	5.0	est.	[1288]	
$NH + HNO = NH_2 + NO$	-	-	11.3	1/2	2.0	est.	[1288]	
$NH + NH_3 = N_2H_4$	300	12.98±0.14	-	-	-	pulse photol.	[1045]	
$NH_2 + O_2 = HO_2 + NH$	1550–2300	-	-	0	42.5±1.2	shock	[1764]	
$NH_2 + NH_2 = NH_3 + NH +$	298	5.84	-	-	-	dis.	[318]	
$+ 14 \pm 6$	300	11.66	-	-	-	pulse photol.	[1349]	
	2000	13.40	-	-	-	shock	[457]	
	-	-	12.8	0	10.0	therm., comp.	[1119]	
	300 and 2000	-	~13.7	0	~2.8	-	[457, 1349]	
$NH_2 + NH_2 = N_2H_2 + H_2$	-	-	13.6	0	12.0	therm., comp.	[1119]	
$NH_2 + NH_3 = N_2H_3 +$ $+ H_2 - (15 \pm 10)$	2200–2915	-	-	0	27	shock	[216]	
$NH_2 + N_2H_4 = NH_3 +$ $+ N_2H_3$	750–1000	-	12.0	0	7.0	therm., flow	[497]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$NH_2 + HNO = NH_3 + NO$	-	-	11.78_5	1/2	0	est.	[1288]	
$NH_2 + NH_2 \rightarrow N_2H_4$	room	12.36±0.04	-	-	-	dis.	[714]	1312
	"	12.40	-	-	-	"	[1349]	
	298	5.80	-	-	-	"	[318]	
$NHCH_3 + CHF_3 =$ $= NH_2CH_3 + CF_3$	303–435	-	~9.9	0	~18.4	from k_- and K	[1145]	
$N_2H_3 + N_2H_3 = 2NH_3 +$ $+ N_2$	423	≥ 12.48	-	-	-	dis., flow	[1364]	
	750–1000	12	-	-	-	calc. from reaction mechanism	[497]	85
$N_2H_3 + N_2 = NH + NH_2 +$ $+ N_2$	750–1000	-	12.9	0	18	calc. from reaction mechanism	[497]	
$N_2H_3 + N_2 = N_2 + H_2 +$ $+ H + N_2$	750–1000	-	13	0	20	calc. from reaction mechanism	[497]	
$NF + NF = N_2 + 2F$	2500	13.40	-	-	-	shock	[458]	1313
$NF_2 + F_2 = NF_3 + F +$ $+ 21.1 \pm 2$	308–359	-	10.25_5	0	9.7±0.7	therm.	[1002]	
	1100–1600	-	12.68	0	14.4	shock	[461]	1314
$NF_2 + Ne = NF + F +$ $+ Ne$	2200–3000	-	15.34	0	57.0	shock	[460]	
$NF_2 + Ar = NF + F +$ $+ Ar$	1400–2000	-	13.21	1/2	47.83_8	shock	[1130]	
	"	-	12.91	1/2	47.83_8	"	[1130, 1131]	
	"	-	14.78	0	52.0	"	[1130, 460]	
$NCl_2 + NCl_2 + M =$ $= N_2Cl_4 + M$	259–373	-	11.64±0.06	0	0 ± 0.3	dis., flow	[365]	
	293	11.63_5 ± ± 0.08	-	-	-	"	"	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$OH + H_2 = H_2O + H +$ $+ 14.7$	293 ± 3	9.98	-	-	-	mass spect.	[1726]	
	300	9.59±0.02	-	-	-	dis., flow	[474]	
	"	9.54	-	-	-	-	[1628]	
	301	9.60±0.02	-	-	-	pulse photol.	[685]	
	310	9.62±0.10	-	-	-	dis., flow	[895, 892]	
	378–489	-	12.62	1/2	10.0	"	[1693]	1315
	627	11.3±0.2	-	-	-	inhib.	[1705]	
	813	≥ 10.4	-	-	-	"	"	
	900–1052	-	14.04±0.18	0	8.6±1.2	fl., EPR	[1707]	
	"	-	14.01	0	8.6	comp.	"	
	915	12.04	-	-	-	fl.	[469]	
	960–1080	-	14.17	0	6.43	comp.	[1408]	34
	1000–1700	-	13.17_6	0	5.0	"	[248]	
	1072	12.03±0.08	-	-	-	fl.	[471]	
	1400–2500	-	13.6	0	5.7	comp.	[1326]	
	1660–1850	-	14.40	0	10.0	fl.	[537]	
	300–915	-	13.13	0	5.0±0.6	-	[471]	1316
	300–1850	-	13.37±0.24	0	5.2±0.3	-	[474]	1317
	300–2000	-	13.8±0.7	0	5.9±1.0	-	[895]	1318
	310–915	-	13.28	0	5.2±0.6	-	[469]	1319
	300–2500	-	13.35±0.08	0	5.24±0.17	-	-	1320
$OH + D_2 = HDO + D$	300	9.10±0.06	-	-	-	pulse photol.	[687]	1321
	473–623	-	114.01±0.27	0	7.64±0.77	photol. H_2O	[1535]	1322
	300–623	-	13.27±0.30	0	5.77±0.56	-	-	1323
$OH + OH = H_2O + O$	room	12.10±0.02	-	-	-	dis.	[1623]	
	300	12.06_5±0.11	-	-	-	dis., flow, $H + NO_2 =$ $= OH + NO$	[1583]	
	"	12.18_8 ± ± 0.03_4	-	-	-	"	[474]	
	"	11.93	-	-	≤ 2	"	[892]	
	300–2000	-	12.88±0.3	0	1.0 ± 0.5	est.	[895]	1324,1325
	310	12.16±0.10	-	-	-	dis., flow, $H + NO_2 =$ $= OH + NO$	[450]	
	300-2400	-	12.90±0.19	0	1.40±0.36	from k_ and K	-	51
$OH + OH = H_2 + O_2 +$ $+ 18.7$	960–1080	-	12.85	0	48.6	-	[1408]	186
$OH + HO_2 = H_2O + O_2$	room	≥ 12.78	-	-	-	est.	[892]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$OH + H_2O_2 = H_2O +$	room	11.71_5	-	-	-	pulse photol.	[683, 684]	
$+ HO_2 + 30.7 \pm 2.7$	"	≥ 11.38	-	-	-	mass spect.	[564, 563]	
	300-458	-	11.39 ± 0.05	1/2	1.2	pulse photol.	[688]	
	"	-	12.90	0	1.58	"	"	
	773	12.54	-	-	-	therm.	[89, 91]	1326
	798	12.37	-	-	-	pyr. H_2O_2, flow	[783]	1327
	300-800	-	12.90	0	1.6	-	-	1328
$OH + C_2 = CO + CH'(^2\Delta)$	875-1665	11.56	-	-	-	fl.	[1256]	
$OH + C_2 = CO + CH'(^2\Sigma)$	875-1665	10.62	-	-	-	fl.	[1256]	
$OH + F_2 = HF + O +$	770-830	-	13.84_4	0	18	ignit. lim.	[1189]	1329
$+ F - 4.8 \pm 1.2$	1370-1730	-	15.3	0	18	flame propagation	[1441, 1189]	
	770-1730	-	16.80 ± 0.35	0	28.7 ± 1.6	-	-	1330
$OH + CO = CO_2 + H +$	room	10.95 ± 0.02	-	-	-	dis.	[1623]	
$+ 24.4$	300	11.06 ± 0.02	-	-	-	dis., flow	[474]	
	"	10.67 ± 0.18	-	-	-	"	[759]	1331
	300	10.95	-	-	-	dis., flow	[759, 1623]	1332
	301	$10.94_5 \pm 0.04_5$	-	-	-	pulse photol.	[685]	
	380-520	-	11.78	1/2	7.0	"	[1693]	1333
	473-623	-	11.87 ± 0.15	0	1.24 ± 0.47	photol. H_2O	[1535]	1334
	773	11.39	-	-	-	therm.	[89]	1322
	1000-1700	-	11.5	0	0.7	comp.	[248]	
	1300	~11.62	-	-	-	fl.	[532, 542]	"
	1380-1720	-	12	0	4	therm., flow	[871]	
	1400-3000	-	11.57	0	0.7	shock	[247]	
	1600	11.28	-	-	-	fl.	[1256]	
	~1950	~11.95	-	-	-	"	[1589]	
	2200	12.10	-	-	-	"	[737]	
	273-1923	-	11.82	0	1.03	-	[1371]	1335
	300-1850	-	11.50 ± 0.24	0	0.6 ± 0.3	-	[474]	1336
	300-1950	-	11.96	0	1.7	-	[759]	1337
	400-2000	-	12.85	0	7.7	-	[1590]	1338
	473-1072	-	11.5 ± 0.24	0	0.5 ± 0.6	-	[471]	1339
	300-1720	-	11.59 ± 0.07	0	0.81 ± 0.13	-	-	1340

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$OH + CO_2 = HO_2 + CO$	-	-	10.21	0.93	60.52	calc.	[1290]	
$OH + CO_2 = O_2 + HCO$	-	-	10.86	1/2	81.90	calc.	[1290]	
$OH + NO = HO_2 + N$	-	-	11.32	1/2	76.8	-	[1288]	
$OH + NO = NO_2 + H$	-	-	14	0	1.2	-	[1288]	
$OH + HCl = H_2O + Cl$	-	-	12.41_4	0.55	1.3	est.	[1287]	
	-	-	11.0	1/2	6.0	"	"	
$OH + HBr = H_2O + Br$	588-788	-	-	0	~ 0	therm., flow, est.	[413]	
$OH + O_3 = HO_2 + O_2$	room	$\angle 11.48$	-	-	-	-	[892]	
$OH + NH_2 = H_2O + NH$	-	-	10.48	0.68	1.3	-	[1288]	
$OH + NH_3 = H_2O + NH_2$?	1760-2037	-	15.3	0	38 ± 5	fl.	[536]	
$OH + NH_3 = H_2O + NH_2 + 14 \pm 2$	-	-	10.6	0.68	1.1	-	[1288]	
$OH + HNO = H_2O + NO$	1600-2000	13.93 ± 0.15	-	-	-	fl.	[258]	
	2000	13.53 ± 0.15	-	-	-	"	[708]	
	-	-	12.48	1/2	1.20-2.38	-	[1288]	
$OH + HNO = NO_2 + H_2$ or $NO + H_2O$	1600-2000	13.93 ± 0.15	-	-	-	fl.	[258]	
$OH + HNO = H_2O + NO$	-	-	12.32	1/2	0	-	[1288]	
	-	-	11.3	1/2	2	est.	"	
	-	-	11.48	1/2	0.1	"	"	
	-	13.95	-	-	-	-	"	1346
$OH + HNO_2 = H_2O + NO_2$	-	-	14	0	4	est.	[1288]	
$OH + HNO_3 = H_2O + NO_3$	300	11.00 ± 0.05	-	-	-	pulse photol. HNO_3	[810]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$OH + CH_3 = CH_4 + O$	1970–2190	~12.4	-	-	-	fl.	[529]	
$OH + CH_4 = H_2O + CH_3$	298–423	-	13.7	0	5.00	pulse photol.	[802]	
	300	9.8±0.1	-	-	-	dis., flow	[1625]	
	301	9.72±0.02	-	-	-	pulse photol.	[685]	
	323–518	-	14.38	0	8.3	dis., flow	[1667, 1692]	1341
	438–623	-	-	0	8.5	photol.	[1543]	1342
	673–923	-	-	-	-	pyr. H_2O_2	[781, 783]	1343
	773	11.87±0.17	-	-	-	therm.	[94]	1344
	773–825	-	13.9	0	2.6	-	[666]	1345
	1225–1800	-	14.54	0	9.0±1.5	fl.	[539]	
	1285	12.45±0.15	-	-	-	"	[473]	
	1365–1815	-	14.15	0	6.5	"	[595]	
	1650–1840	13.3	-	-	-	"	[1589]	
	300–1670	-	13.46	0	5.0	-	[1625]	1347
	300–1800	-	13.4±0.2	0	5.1±0.4	-	[473]	1348
	773–1773	-	14.34	0	7.7	-	[94, 539]	
	300–1800	-	13.90±0.14	0	5.78±0.38	-	-	1349
$OH + C_2H_6 = H_2O + C_2H_5$	298–423	-	14.1±0.7	0	3.6±0.6	pulse photol.	[802]	
	302±2	11.24±0.06	-	-	-	"	[686]	
	338–501	-	12.78	1/2	5.5±0.5	dis., flow	[1692]	
	793	13.02	-	-	-	inhib.	[96, 98]	1350
	1300–1550	~12.7	-	-	-	fl.	[1590]	
	1400–1600	~13.48	-	-	-	"	[541]	
	302–793	-	14.11	0	3.97	-	-	1351
$OH + C_3H_8 = H_2O + C_3H_7$	298±1	11.91±0.07	-	-	-	pulse photol.	[686]	
	793	13.34	-	-	-	inhib.	[83, 98]	1350
$OH + n\text{-}C_4H_{10} = H_2O + C_4H_9$	793	13.46	-	-	-	inhib.	[98]	1350
$OH + iso\text{-}C_4H_{10} = H_2O + C_4H_9$	297±1	$12.10_5 \pm 0.02_5$	-	-	-	pulse photol.	[686]	
	793	13.21	-	-	-	inhib.	[98]	1350
$OH + C_2H_4 = H_2O + C_2H_3$	350–451	-	13.03_5	1/2	6.0±0.5	dis. H_2O	[1692]	
	350–451	-	14.6	0	6.4	"	"	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks[e]
	813	13.04	-	-	-	inhib.	[97]	
	1250-1400	13.0	-	-	-	fl.	[1590]	
	350-1400	-	14.21±0.38	0	5.625 ± ±0.885	-	-	1352
$OH + C_2H_2 = H_2O + C_2H$	323-510	-	12.98	1/2	7.0±0.5	dis. H_2O	[1692]	
	"	-	14.45	0	7.3	dis.	[1692]	
	1000-1700	-	12.78	0	7.0	comp.	[248]	
	1600	12.08	-	-	-	fl.	[1256]	
	1700-2000	12.30	-	-	-	"	[543]	
	300-2000	-	12.88±0.32	0	4.64±0.79	-	-	1353
$OH + HCHO = H_2O + HCO$	346-489	-	9.78	1/2	0.5	dis.	[1668]	
	"	-	10.78	0	< 0.5	"	"	
	588	-	-	-	~ 2.0	therm.	[413]	
	773	13.79	-	-	-	"	[185]	1354
	798-923	-	14.06	0	0.78	pyr. H_2O_2	[781]	1356
	"	-	13.9	0	2.5	"	[783]	1355
	1250-1550	-	15.7	0	13.0	fl.	[1590]	1357
	770-1500	13.77	-	-	-	-	-	1358
$OH + CH_3CHO = H_2O +$ $+ CH_3CO$	326-482	-	13.53	0	4	dis.	[1668]	
$OH + CH_3Br = H_2O +$ $+ CH_2Br$	1800-2000	~13.18	-	-	-	fl.	[1621]	
$OH + OH + He = H_2O_2 +$	room	17.49	-	-	-	pulse photol.	[287]	1359
$+ He$	"	15.67±0.05	-	-	-	photol. H_2O	[176]	1360
$OH + OH + Ar = H_2O_2 +$	room	17.54_5	-	-	-	pulse photol.	[287]	1359
$+ Ar$	"	15.73±0.06	-	-	-	photol. H_2O	[176]	1360
$OH + OH + Xe = H_2O_2 +$	room	17.67	-	-	-	pulse photol.	[287]	1359
$+ Xe$	"	15.86±0.04	-	-	-	photol. H_2O	[176]	1360
$OH + OH + N_2 = H_2O_2 +$	room	18.08	-	-	-	pulse photol.	[287]	1359
$+ N_2$	"	16.26±0.05	-	-	-	photol. H_2O	[176]	1360
$OH + OH + O_2 = H_2O_2 +$	room	18.26_6	-	-	-	pulse photol.	[287]	1359
$+ O_2$	"	16.44±0.12	-	-	-	photol. H_2O	[176]	1360

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$OH + OH + H_2O = H_2O_2 + H_2O$	room	18.81	-	-	-	pulse photol.	[287]	1359
	"	17.02±0.03	-	-	-	photol. H_2O	[176]	1360
$OH + OH \rightarrow H_2O_2$	300	$13.55_5 \pm 0.17_5$	-	-	-	pulse photol.	[688]	1361
$OH + OH + CO_2 = H_2O_2 + CO_2$	room	18.18	-	-	-	pulse photol.	[287]	1359
	"	16.34±0.14	-	-	-	photol. H_2O	[176]	1360
$OH + NO \rightarrow HNO_2$	-	-	14	0	3	est.	[1288]	
$OH + Xe = O + H + Xe$	1750-2750	-	21.0	-3/2	101.0	est.	[488]	1362
$OD + CO = CO_2 + D$	300	10.52±0.1	-	-	-	dis. D_2, $D + NO_2$, flow	[1591]	
$OD + OD = D_2O + O$	300	$11.97_5 \pm 0.04_5$	-	-	-	dis. D_2, $D + NO_2$, flow	[1591]	
$OD + CH_4 = HDO + CH_3$	300	9.68±0.02	-	-	-	pulse photol.	[687]	
$OD + C_2H_6 = HDO + C_2H_5$	300	11.22	-	-	-	pulse photol.	[687]	
$SH + CH_4 = H_2S + CH_3$	-	-	12.8	0	15.6	-	[816]	
$SH + CF_3H = H_2S + CF_3$	336-374	-	12.04	0	19.1	from k_- and K	[24]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$HO_2 + H_2 = H_2O_2 + H$	743-773	-	13.22	0	25 ± 4	comp.	[90, 91]	1363
	890-1080	-	-	0	14.8±2.2	shock	[1126]	
	960-1080	-	16.50_5	0	34.6	comp.	[1408]	
$HO_2 + H_2 = H_2O_2 + H$ or $H_2O + OH$	702-863	-	11.08	0	24	ignit. lim.	[1715, 1553]	
$HO_2 + N_2 = HNO + NO$	-	-	10.9	1/2	41.8	-	[1288]	
$HO_2 + CO = CO_2 + OH$	-	-	10.88_6	1/2	0	calc.	[1290]	
$HO_2 + NO = NO_2 + OH$	-	-	12.48	1/2	1.20-2.38	-	[1288]	
$HO_2 + NO = HNO + O_2$	-	-	10.86	1/2	10.8	-	[1288]	
$HO_2 + H_2O = H_2O_2 + OH$	873-888	-	13.25	0	30	therm.	[1736a, 1759]	1364
$HO_2 + HO_2 = H_2O_2 + O_2 + 40$	298	12.26	-	-	$\angle 2$	mass spect.	[563]	
	298-319	13.81	-	-	-	Hg photo.	[264]	
$HO_2 + HNO = H_2O_2 + NO$	-	-	10.28	1/2	1.56	-	[1288]	
$HO_2 + HCHO = H_2O_2 + HCO$	763-798	-	-	-	-	therm., stat.	[784]	1365, 1366
$HO_2 + C_2H_4 \rightarrow [C_2H_5O_2]$	295-338	-	10.98	0	1.1	dis.	[1674]	1677
$HO_2 +$ iso-$C_4H_8 \rightarrow [C_4H_9O_2]$	295-338	-	12.48	0	1.7	dis.	[1674]	1677
$HO_2 + Ar = H + O_2 + Ar$	960-1080	-	20.00_4	- 1	50.0	comp.	[1408]	1367

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3O + NO = HNO + HCHO$	447	-	-	-	-	-	[33]	1377
$CH_3O + NO_2 = HCHO + HNO_2$	403	-	-	-	-	pyr. $(CH_3O)_2$	[77]	1378
$CH_3O + O_2 = HO_2 + HCHO$	373	-	-	-	-	photol.	[789]	1379
	373 and 423	-	-	-	-	photochem.	"	1380
$CH_3O + CH_4 = CH_3OH + CH_3$	403–523	-	11.8	0	11.0	calc.	[1398]	1381
$CH_3O + C_2H_6 = CH_3OH + C_2H_5$	468–597	-	11.8	0	7.1	pyr. $(CH_3O)_2$	[158, 1399]	1382, 1383
	468–673	-	11.2	0	7.1	calc.	[1398]	1384
$CH_3O + C_3H_8 = CH_3OH + iso\text{-}C_3H_7$	468–673	-	11.6	0	5.2	pyr. $(CH_3O)_2$	[158, 1399]	1382, 1383
$CH_3O + n\text{-}C_4H_{10} = CH_3OH + sec\text{-}C_4H_9$	468–673	-	10.8	0	2.9	pyr. $(CH_3O)_2$	[158, 1399]	1382, 1383
$CH_3O + iso\text{-}C_4H_{10} = CH_3OH + (CH_3)_3C$	463–533	-	11.30±0.24	0	4.1±0.6	pyr. $(CH_3O)_2$	[158, 1399]	1382,1383
$CH_3O + (CH_3)_4C = CH_3OH + (CH_3)_3CCH_2$	463–533	-	12.1	0	7.3	pyr. $(CH_3O)_2$	[158, 1399]	1382, 1383
$CH_3O + cyclo\text{-}C_3H_6 = CH_3OH + cyclo\text{-}C_3H_5$	468–597	-	12.5	0	9.7	pyr. $(CH_3O)_2$	[158, 1399]	1382, 1383
$CH_3O + CH_3O = CH_3OH + HCHO$	298	-	-	-	-	photo-ox. CH_3I	[743]	1385
	"	-	-	-	-	photochem.	[453]	1386
	304–376	13.26	-	-	-	photol. $HCOOCH_3$	[1650, 1653]	1387
	314	14.18	-	-	-	photol. $CH_3OCOOCH_3$	[1649]	853
	-	-	14.6	0	0	est.	[669]	
$CH_3O + CH_3OH = CH_3OH + CH_2OH$	428–453	-	-	0	6	pyr.	[1465, 669]	1388

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3O + (CH_3O)_2 =$ $= CH_3OH + CH_2OOCH_3$	294–333	-	-	-	<5.8	photol.$(CH_3O)_2$	[1463]	
$CH_3O + HCO = CH_3OH + CO$	304–376	14.14	-	-	-	photol.$HCOOCH_3$	[1650, 1653]	966
$CH_3O + HCHO = CH_3OH +$ $+ HCO$	455	9.6	-	0	3.0	photol.	[669]	1389
$CH_3O + HCOOCH_3 = CH_3OH +$ $+ COOCH_3$	393–458	-	12.21±0.24	0	8.2±0.5	pyr.	[1500, 1502]	1390
$CH_3O + CH_3COOCH_3 =$ $= CH_3OH + CH_2COOCH_3$	336–450	-	-	0	~4.5	photol. CH_3COOCH_3	[1601]	1391
	"	-	10.0	0	4.8	"	"	853, 1392
$CH_3O + CH_3OCOOCH_3 =$ $= CH_3OH + CH_2OCOOCH_3$	314–365	-	10.75	0	5.92	photol. $CH_3OCOOCH_3$	[1649, 1653]	853
$CH_3O + CHF_3 = CH_3OH +$ $+ CF_3$	357–435	-	9.5	0	7.7	calc.	[1144]	1393
$CH_3O + NO \rightarrow CH_3ONO$	-	9.6	-	-	-	-	[669]	1394
	403	-	-	-	-	pyr. $(CH_3O)_2$	[77]	1395
$CH_3O + NO_2 \rightarrow CH_3ONO_2$	363	-	-	-	-	therm.	[1245]	1396
	-	11.3	-	-	-	-	[1424, 669]	
$CH_3O + CH_3O \rightarrow (CH_3O)_2$	350–415	12.2	-	-	-	therm.	[715, 669]	1397
$CH_3O \rightarrow H + HCHO$	393	-	-	0	~30	pyr.$(CH_3O)_2$	[674]	
$CD_3O + CH_3 = CH_3D +$ $+ DCDO$	303–474	-	-	-	-	photol.	[1603]	1398
$CD_3O + CD_3 = CD_4 +$ $+ DCDO$	303–474	-	-	-	-	photol.	[1603]	1399
$CD_3O + CD_3O = CD_3OD +$ $+ DCDO$	303–363	13.9	-	-	-	photol.	[1602, 669]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CD_3O + CH_3COOCD_3 =$ $= CD_3OH + CH_2COOCD_3$	303-474	-	10.17	0	5.8	photol.	[1603]	853
$CH_2OH + O_2 = HCHO + HO_2$	363-473	-	13.08	0	3.9	dis.	[1672]	
$CH_2OH + CH_2OH = CH_3OH +$ $+ HCHO$	298	-	-	-	-	Hg photo.	[887]	1400
$(CH_3)_2COH + (CH_3)_2COH =$ $= (CH_3)_2CHOH + (CH_3)_2CO$	298	-	-	-	-	Hg photo.	[887]	1401
$CH_2OH \rightarrow HCHO + H$	673-773	-	-	0	29	Hg photo.	[1236]	1402
$CH_3S + CH_4 = CH_3SH +$ $+ CH_3$	403-473	-	12.1	0	18.2	photol.	[680]	1082
$CO_2O + NO \rightarrow$ products	297	-	-	-	-	photol.	[1618]	1403
C_2O + olefin $\rightarrow$ addition product	room	-	-	-	-	photol. C_3O_2	[1619]	
$C_2H_5O + NO = CH_3CHO +$ $+ HNO$	368 368-408	- -	- 10	- 0	- 0	therm. "	[33] "	1051 1476
$C_2H_5O + NO_2 = CH_3CHO +$ $+ HNO_2$	403	-	-	-	-	pyr. $(C_2H_5O)_2$	[77]	1404
$C_2H_5O + C_2H_5 =$ $= C_2H_5OH + C_2H_4$	302	13.7	-	-	-	photol. $C_2H_5COOC_2H_5$	[1607]	1405, 1406
$C_2H_5O + C_2H_5 =$ $= CH_3CHO + C_2H_6$	302	-	13.45	-	-	photol. $C_2H_5COOC_2H_5$	[1607]	1407, 1406
$C_2H_5O + C_3H_8 =$ $= C_2H_5OH + C_3H_7$	413-493	-	-	-	-	photol.	[1760]	1408
$C_2H_5O + C_2H_5O =$ $= C_2H_5OH + CH_3CHO$	295 298 ± 2	- -	- -	- -	- -	pulse photol. photo-ox. C_2H_5I	[465] [744]	1409 1410

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_2H_5O + C_2H_5COOC_2H_5 =$ $= C_2H_5OH + C_2H_4COOC_2H_5$	288–468	-	~12.05	0	~5.5	photol. $C_2H_5COOC_2H_5$	[1607]	908
$C_2H_5O + C_2H_5COOC_2H_5 =$ $= C_2H_5OH + [C_5H_9O_2]$	288–337	-	12.34	0	5.5	photol.	[1607]	820
$C_2H_5O + C_2H_5COOC_2H_5 =$ $C_2H_6 + C_4H_9CO_2$	288–468	-	11.47	0	9.8	photol. $C_2H_5COOC_2H_5$	[1607, 669]	
$C_2H_5O + OH \rightarrow C_2H_5OOH$	565–655	10.7	-	-	-	from k_- and K	[926, 669]	
$C_2H_5O + NO \rightarrow C_2H_5ONO$	-	10.5	-	-	-	-	[1424, 669]	
	403	-	-	-	-	pyr. $(C_2H_5O)_2$	[77]	1411
$C_2H_5O + NO_2 \rightarrow C_2H_5ONO_2$	-	10.8	-	-	-	-	[1238, 669]	
$C_2H_5O + C_2H_5O \rightarrow$ $\rightarrow (C_2H_5O)_2$	407–458	~12.5	-	-	-	therm.	[989]	
	410–520	11.0	-	-	-	"	[669]	1412
$CH_3CHOH \rightarrow CH_3CHO + H$	483–653	-	-	0	≥30	pyr. C_2H_5OH	[102a]	
$C_2H_5O \rightarrow H + CH_3CHO$	318–418	-	-	0	~21	-	[660]	
$C_2H_5O \rightarrow CH_3 + HCHO$	-	-	~10	0	~17	est.	[669]	
	302–468	-	-	0	13	photol. $C_2H_5COOC_2H_5$	[1607]	
	302–475	-	9.6	0	13	photol.	[1605, 1607, 669]	
	318–418	-	-	0	~23	est.	[660, 669]	
	483–653	-	-	0	20	pyr. C_2H_5OH	[102a]	
$CH_2CH_2OH \rightarrow C_2H_4 + OH$	483–653	-	-	0	27	pyr. C_2H_5OH	[102a]	
$CH_2OCH_3 = HCHO + CH_3$	473–573	-	13.2	0	25.5	Hg photo.	[1028]	1413
$CH_2OCH_3 + (CH_3)_2O =$ $= CH_3 + HCHO + (CH_3)_2O$	373–473	-	16.45	0	18.1±2.0	Hg photo.	[1028]	
$CH_2OCH_3 \rightarrow HCHO + CH_3$	298–565	-	-	0	19	Hg photo.	[1052]	1414

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$n\text{-}C_3H_7O + NO \rightarrow$ $\rightarrow n\text{-}C_3H_7ONO$	-	10.8	-	-	-	-	[1424, 669]	
$n\text{-}C_3H_7O + NO_2 \rightarrow$ $\rightarrow n\text{-}C_3H_7ONO_2$	-	11.6	-	-	-	-	[1238, 669]	
$n\text{-}C_3H_7O + n\text{-}C_3H_7O \rightarrow$ $\rightarrow (C_3H_7O)_2$	420-448	12.2	-	-	-	from k_- and K	[669, 720]	
$iso\text{-}C_3H_7O + NO =$ $= (CH_3)_2CO + HNO$	299 and 352	-	-	-	-	therm.	[1080]	1415
	368-408	-	~10	0	~0	"	[33]	
	394-432	-	9.96	0	0	pyr.	[1652]	1416
$iso\text{-}C_3H_7O + OH \rightarrow$ $\rightarrow iso\text{-}C_3H_7OOH$	555-655	12.5	-	-	-	from k_- and K	[926, 669]	
$iso\text{-}C_3H_7O + NO \rightarrow$ $\rightarrow iso\text{-}C_3H_7ONO$	-	10.5	-	-	-	-	[1424, 669]	
$iso\text{-}C_3H_7O + iso\text{-}C_3H_7O \rightarrow$ $\rightarrow (iso\text{-}C_3H_7O)_2$	407-458	~12.5	-	-	-	therm.	[989]	
$iso\text{-}C_3H_7O \rightarrow H +$ $+ CH_3COCH_3$	298	$\bar{2}.83$	-	-	-	-	[1021]	
	523	-	13.5	0	23.5	est.	[120]	
	753-813	-	12.83	0	19.1	pyr. CH_3CHO	[1021]	1417
$iso\text{-}C_3H_7O = CH_3 +$ $+ CH_3CHO$	301-338	-	16.5	0	11.8	est.	[669]	1418
	433-473	-	11.8	0	17.3	pyr. $iso\text{-}C_3H_7ONO$	[407]	1419
$iso\text{-}C_3H_7O \rightarrow CH_3 +$ $+ CH_3CHO$	395-428	-	12.1	0	16.1	pyr.	[1654]	
$iso\text{-}C_3H_7O + iso\text{-}C_3H_7ONO =$ $= CH_3 + CH_3CHO +$ $+ iso\text{-}C_3H_7ONO$	433-473	-	13.1	0	8.3	pyr. $iso\text{-}C_3H_7ONO$	[407]	1420

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
iso $-C_3H_7O$ + + $(CH_3)_2CHONO = CH_3$ + + $CH_3CHO + (CH_3)_2CHONO$	433–473	–	13.1	0	8.3	pyr. iso$-C_3H_7ONO$	[407]	1421
iso $-C_3H_7O + M = CH_3$ + + $CH_3CHO + M$	395–428	–	12.7	0	6.7	pyr.	[1654]	
$(CH_3)_2CHO = CH_3$ + + CH_3CHO	433–473	–	11.8	0	17.3	photol.	[407]	1422
	453–473	–	9.6	0	12.5	pyr.	[1024]	"
$(CH_3)_2CHO + (CH_3)_2CHONO =$ $= CH_3 + CH_3CHO$ + + $(CH_3)_2CHONO$	433–473	–	13.1	0	8.3	photol.	[407]	1422
	453–473	–	13.6	0	9.5	pyr.	[1024]	1422,1423
$(CH_3)_2CHO \rightarrow CH_3$ + + CH_3CHO	448–473	–	~10.65	0	~16	pyr.	[546]	
$n-C_4H_9O + NO \rightarrow$ $\rightarrow n-C_4H_9ONO$	–	10.9	–	–	–	–	[1424, 669]	
$CH_3CHOC_2H_5 \rightarrow CH_3CHO$ + + C_2H_5 ?	306–493	–	–	0	19	γ radiol. $CH_3CHOC_2H_5$	[102]	
	422–452	–	–	0	23.5±2.0	pyr.	[1025]	880
$(CH_3)_3CO + HBr =$ $= (CH_3)_3COH + Br$	413	–	13.5	0	16.5±1	pyr. $(tert-C_4H_9O)_2$, est.	[122]	
$(CH_3)_3CO + (CH_3)_3CH =$ $= (CH_3)_3COH + (CH_3)_3C$	298–352	–	~ 10.78	0	4 ± 2	photol.	[1079]	908
$(CH_3)_3CO + [(CH_3)_3CO]_2 =$ $= (CH_3)_3COH + [C_8H_7O_2]$	298–352	–	–	–	–	photol. $(tert-C_4H_9O)_2$	[1082]	1424
$(CH_3)_3CO + (CH_3)_2NH =$ $= (CH_3)_3COH + (CH_3)_2N$	402–427	–	–	0	~ 5	therm.	[229]	
$(CH_3)_3CO + OH \rightarrow$ $\rightarrow (CH_3)_3COOH$	575–650	11.0	–	–	–	from k_- and K	[926, 669]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$(CH_3)_3CO + NO \rightarrow$	403	-	-	-	-	pyr. $(tert\text{-}C_4H_9O)_2$	[77]	1425
$\rightarrow (CH_3)_3CONO$	433	~13.18	-	-	-	pyr. $[(CH_3)_3CO]_2$	[172]	768
$(CH_3)_3CO + (CH_3)_3CO \rightarrow$ $\rightarrow [(CH_3)_3CO]_2$	390-545	12.4	-	-	-	therm.	[669]	1426
$(CH_3)_3CO = CH_3 +$ $+ (CH_3)_2CO$	398-436	-	14.7	0	22.8±1.6	pyr. $[(CH_3)_3CO]_2$	[1651]	1427
$(CH_3)_3CO + M = CH_3 +$	398-436	-	15.7	0	13.4±1.7	pyr. $[(CH_3)_3CO]_2$	[1651]	1427, 1428
$+ (CH_3)_2CO + M$	823-873	-	16.18±0.5	0	13 ± 2	pyr., from k_- and K	[1315, 767]	1429
$(CH_3)_3CO \rightarrow CH_3COCH_3 +$ $+ CH_3$	298-352	-	-	0	9 ± 2	photol. $(tert\text{-}C_4H_9O)_2$	[1082, 1607]	
	298-352	-	11.2±1.3	0	11 ± 2	photol.	[1079, 669]	908, 1430
	306-393	-	-	0	11.2±2.0	photol. $(tert\text{-}C_4H_9O)_2$	[1558]	1431
	402-427	-	-	0	17±3	therm.	[229]	
	"	-	9.7	0	17	"	[229,1524]	1432
	403-443	-	9.7±1.2	0	13.2±2.4	therm.	[171]	1433
$CH_2OC_6H_5 \rightarrow C_6H_5CHO + H$	453-539	-	12.5	0	21.10	pyr. $(tert\text{-}C_4H_9O)_2$	[1156,1154]	1434
$iso\text{-}C_3H_7O_2 + C_3H_8 =$ $= iso\text{-}C_3H_7OOH + C_3H_7$	413-493	-	-	-	-	photochem.	[1760]	1435
$iso\text{-}C_3H_7O_2 + HBr =$ $= CH_3COCH_3 + OH + HBr$	413-493	-	-	-	-	photochem.	[1760]	1436
$HCO + CH_3 \rightarrow\ ?$	473	14.60_2	-	-	-	photol. CH_3CHO	[704]	
	473 and 573	-	15.80_8	0	2.6	"	"	
	573	14.81_8	-	-	-	"	"	
$HCO + HCO = H_2 + 2CO$	304 - 376	13.34	-	-	-	photol.	[1653]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$HCO + CH_3CHO = ?$	473	8.98_6	-	-	-	photol. CH_3CHO	[704]	
	473 and 573	-	14.20	0	11.3	"	"	
	573	9.89_2	-	-	-	"	"	
$HCO + HCO \rightarrow (HCO)_2$	303–376	11.22	-	-	-	photol. $HCOOCH_3$	[1650,1653]	
$HCO + M = H + CO + M$	>373	-	-	0	12	dis. H_2	[1445]	
	1000–1700	-	13.84	0	15	fl. , comp.	[248]	
$HCO \rightarrow H + CO$	303–403	-	-	0	26 ± 2	photol. CH_3CHO	[651]	1437
	373–573	-	-	0	~14	photol. C_3H_7CHO	[174]	
	"	-	13.69	0	15.3	-	[296]	1438
	>373	-	-	0	12	photochem.	[1445]	1439
	430–568	-	-	0	≥13	photol. HCHO	[300]	
	448–498	-	-	0	~14	photol. $(CH_3)_2CO$	[1051]	1440
	473 and 573	-	4.0	0	7.8	photol. CH_3CHO	[704]	
	775 - 809	-	5.3	0	26.3	pyr. $(CH_3)_2CO$	[1519]	1441
$CH_3CO + O_2 = CH_3O + CO_2$	373 and 423	-	11.87	0	1.14	photochem.	[789]	1442
$CH_3CO + O_2 \rightarrow CH_3CO_3$	315	11.92	-	-	-	therm.	[1747]	1443
	360	11.36	-	-	-	"	[1769]	820
	373	11.28	-	-	-	photol.	[789]	1444
	373 and 423	-	10.61	0	-1.14	"	"	
	423	11.20	-	-	-	"	"	
$CH_3CO + I_2 = CH_3COI + I$	495–541	-	12.60	0	0	therm.	[1204, 1203]	
$CH_3CO + HI = CH_3CHO + I$	495–541	-	12.23	0	1.5	therm.	[1204, 1203]	
$CH_3CO + (CH_3)_2CO = CH_3 + CO + (CH_3)_2CO$	508–568	-	14.5	0	12.0	photol. acetone	[1202]	
$CH_3CO + (CH_3N)_2 = CH_3 + CO + (CH_3N)_2$	338	6.97	-	-	-	photol. azomethane	[912]	768, 1445

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH_3CO = CH_3 + CO$	338	1.97	-	-	-	photol. azomethane	[912]	768
	508–568	-	10.3	0	15.0	photol. acetone	[1202]	
$CH_3CO \rightarrow CH_3 + CO$	273–413	-	10.1	0	13.4	photol.	[30]	1446
	295–400	-	10.22	0	13.5	photol. acetone	[297]	908
	300–430	-	9.58	0	12 ± 2	-	[296]	1447
	353 and 373	-	-	0	13.5 ± 2.0	photol. $(tert\text{-}C_4H_9O)_2$	[1558]	
	373–393	-	-	0	~ 13.5	photol. acetone	[1557]	1448
	393–498	-	-	0	16 ± 2	"	[1051]	1449, 1450
	-	-	10. 22	0	13.5	-	[1081]	
	273–413	-	10.18 ± 0.15	0	13.49 ± 0.23	-	-	1451
$C_2H_5CO = C_2H_5 + CO$	303–353	-	13.32	0	14.7	photol. $(C_2H_5N)_2$	[913]	1452
$C_2H_5CO + M = C_2H_5 + CO + M$	303–353	-	15.64	0	10.5	photol. $(C_2H_5N)_2$	[913]	1453, 1452
$CH_2COCH_3 + C_2H_4 \rightarrow C_3H_6COCH_3$	403–503	-	11.41 ± 0.15	0	6.6 ± 0.3	photol. $(CH_3)_2CO$, stat., from k_- and K	[509, 1561]	
$C_2H_4COC_2H_5 \rightarrow C_2H_4 + C_2H_5CO$	-	-	-	0	17	-	[1524]	1454
$C_3H_6COH\text{-}C_3H_7 \rightarrow C_3H_6 + n\text{-}C_3H_7CO$ or $C_3H_6 + CO + H\text{-}C_3H_7$	434–630	-	-	0	10	photol. $(n\text{-}C_3H_7)_2CO$	[1060]	1455
$(CH_3)_2CCOC_3H_6D \rightarrow (CH_3)_2CCO + C_3H_6D$	423–648	-	-	0	28 ± 7	photol.	[751]	
$C_3H_6DCOCDCH_2CH_3 \rightarrow C_3H_6DCO + CH_3CDCH_2$	423–648	-	-	-	-	photol. $(C_3H_6D)_2CO$	[751]	
$CH_3CDCOCH_3CD_2 \rightarrow C_2H_3D + CO + CD_2CH_3$	374–638	-	-	0	17	photol. $(CH_3CD_2)_2CO$	[1608]	1456
$CH_3CO_3 + CH_3CHO = CH_3CO_3H + CH_3CO$	360–403	-	12.75	0	6.8	therm.	[1769]	820
$CH_3SO_2 \rightarrow CH_3 + SO_2$	294–312	-	13.0	0	22.4	photol. $(CH_3N)_2$	[644]	
$C_2H_5SO_2 \rightarrow C_2H_5 + SO_2$	313–348	-	14.4	0	19.9	photol. $(C_2H_5)_2CO$	[645]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Cl_3 + CO = COCl_2 + Cl$	621-725	-	12.80	0	26.3	therm.	[201]	1457
$Cl_3 \rightarrow Cl_2 + Cl$	room	$\lessgtr$ 5.88	-	-	-	dis., flow	[812]	
$ClO + H_2 = HCl + OH$	294	< 8.48	-	-	-	dis., Cl_2 flow	[376]	
$ClO + O_3 = ClO_2 + O_2$	294	< 9.5	-	-	-	dis., flow	[376]	
$ClO + ClO = Cl_2 + O_2$	293	10.79	-	-	-	pulse photol. Cl_2O	[1020]	
	293-433	-	10.84±0.49	0	0±0.65	pulse photol.	[1255]	
	room	10.37±0.07	-	-	-	pulse photol. Cl_2O	[501]	
	298	10.23±0.03	-	-	-	dis.	[374]	
$ClO + ClO = ClO_2 + Cl$	294-495	-	11.83±0.13	0	2.5±0.3	dis., Cl_2, flow	[376]	1458
	"	-	10.13±0.13	1/2	1.9±0.4	"	"	
$ClO + Cl_2O = ClO_2 + Cl_2$	room?	8	-	-	-	pulse photol. Cl_2O	[501]	
$ClO + Cl_2O = Cl + O_2 + Cl_2$	283	7.3	-	-	-	pulse photol.	[501]	
	room?	7.72	-	-	-	"	"	
$ClO_2 + F_2 = FClO_2 + F$	227-247	-	10.57	0	8.5±0.4	therm.	[60]	
$ClO_2 + O_3 = ClO_3 + O_2$	288-333	-	-	0	< 3	therm., est.	[713]	
	323	-	~12	-	-	therm.	"	
$ClO_3 + O_3 = ClO_2 + 2O_2$	288-333	-	~12	0	~11.8	therm., est.	[713]	
$ClO_3 + ClO_3 = Cl_2 + 3O_2$	288-333	-	~11.8	0	~11.5	therm., est.	[713]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_2HCl_4O_2 + C_2HCl_4O_2 =$ $= 2C_2HCl_4O + O_2$	363-403	-	13	0	0	photol. Cl_2	[813]	
$C_2HCl_4O_2 + C_2HCl_4O_2 =$ $= C_2HCl_4OOC_2HCl_4 + O_2$	363-403	-	11	0	0	photol. Cl_2	[813]	
$C_2HCl_4O_2 + C_2HCl_4 \rightarrow$ $\rightarrow C_2HCl_4OOC_2HCl_4$	383	~ 13	-	-	-	photol. Cl_2	[813]	
$C_2HCl_4O_2 \rightarrow C_2HCl_4 +$ $+ O_2$	363-403	-	14.5	0	20±2	photol. Cl_2	[813]	
$C_2Cl_5O_2 + C_2Cl_5O_2 =$ $= 2C_2Cl_5O + O_2$	353 and 373	-	12.9	0	0	photol. Cl_2, est.	[815]	
$C_2Cl_5O_2 + C_2Cl_5O_2 =$ $C_2Cl_5O_2C_2Cl_5 + O_2$	353 and 373	-	10.7	0	0	photol. Cl_2, est.	[815]	
$C_2Cl_5O_2 \rightarrow C_2Cl_5 + O_2$	353 and 373	-	14.5	0	18.00	photol. Cl_2	[815]	1460
$COCl + O_2 = CO_2 + ClO$	298-403	-	-	-	-	photol. Cl_2	[1333]	1461
$COCl + Cl_2 = COCl_2 +$ $+ Cl$	283-313 298-328	- -	9,23 12.4	1/2 0	2.61 2.96	photol. Cl_2 "	[194] [268]	
$COCl + NOCl = COCl_2 +$ $+ NO$	298-328	-	13.68	0	1.14	photol. Cl_2	[269]	
$COCl \rightarrow CO + Cl$	298-328	-	~11.6	0	~6.3	photol. Cl_2, est.	[268]	
$CF_3CO + Cl_2 = CF_3COCl +$ $+ Cl$	292-370 300-503	- -	≦11.715 ≦12.62±0.06	0 0	≧1.9 ≧3,52±0,10	photol. CF_3COCF_3 photol. Cl_2	[1532,23] [23]	
$CF_3CO + Br_2 = CF_3COBr +$ $+ Br$	333-523	-	≦12.37±0,12	0	≧1,17±0,21	photol. Br_2	[23]	
$CF_3CO \rightarrow CF_3 + CO$	292-524 300-523	- -	- ≦ 10.41_4	- 0	- ≧ 10	photol. $(CF_3)_2CO$ photol.	[1532] [23]	1462

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
CCl_3- vinyl acetate + + CCl_3Br = = $CCl_3BrC_4O_2H_6$ + CCl_3	303	6.44	-	-	-	photol. CCl_3Br	[1107]	
	303-328	-	10.96	0	7.5	"	"	
$2CCl_3$- vinyl acetate → → $(CCl_3C_4O_2H_6)_2$	308	10.46	-	-	-	photol. CCl_3Br	[1107]	
$CF_2NO \rightarrow CF_2 + NO$	1600-2500	-	6.50±0.39	0	20.6±3.6	shock	[1129]	
$F_3SO + F_2 = F_4SO + F$	278-297	-	-	0	10±2	photol. F_2	[328]	
$HgCl + HgCl + CF_3Cl$ = = $(HgCl)_2 + CF_3Cl$	383-443	≥ 13	-	0	≥ -1.2	Hg photo.	[451]	
$CN + H_2 = HCN + H$	500	-	-	-	-	dis., N_2, flow	[1390]	1368
	533-623	-	-	0	7	rare. fl.	[733]	
	687	< 11.3	-	-	-	dis., N_2, flow	[191]	
$CN + CN = C_2 + N_2$ - - 20 ± 16	2500-7000	-	15.20_4	0	43.0	shock	[1222]	
$CN + NO = N_2 + CO + 137$	687	11.35±0.35	-	-	-	dis., N_2, flow	[191]	
$CN + O_2 = NCO + O$	room	≥ 12.59	-	-	-	pulse photol.	[110]	
	"	12.74	-	-	-	"	[1223]	
	"	-	-	-	-	"	[1150]	
	687	12.59±0.21	-	0	0±0.5	dis., flow	[191]	
$CN + O_2 = NO + CO$ + + 134	room	≤ 11.84	-	-	-	pulse photol.	[110]	
$CN + ClCN = C_2N_2 + Cl$	296	9.17_6	-	-	-	pulse photol.	[1223]	1369

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	2320–2820	-	13.04	0	6.0	shock	[1370]	
	300–2820	-	12.97±0.01	0	5.13±0.02	-	-	1370
$CN + H_2O = HCN + OH$?	room	11.48	-	-	-	pulse photol.	[1223]	
$CN + NH_3 = HCN + NH_2$	500	-	-	-	-	dis., N_2, flow	[1390]	1371
	687	12.64±0.28	-	-	-	"	[191]	
$CN + CH_4 = HCN + CH_3$	305–412	-	-	-	-	photol. ICN	[657]	1372
	687	$\angle$11.84	-	-	-	dis., N_2, flow	[191]	
$CN + C_2H_6 = HCN + C_2H_5$	305–412	-	-	-	-	photol. ICN	[657]	1373
$CN + C_3H_8 = HCN + n\text{-}C_3H_7$	305–412	-	-	-	-	photol. ICN	[657]	1374
$CN + C_2H_2 = HCN + C_2H$	room?	~8.78	-	-	-	dis., flow	[1347]	1375
$CN + C_2H_2 = CNC_2H + H$	room?	~8.78	-	-	-	dis., flow	[1347]	1375
$CN + CN \rightarrow C_2N_2$	room	11.78	-	-	-	pulse photol.	[111]	
$CN + C_2N_2 \rightarrow C_3N_3$	301–447	-	10.86	0	2.1	pulse photol.	[1223]	
$CN + NO + N_2 = NOCN + N_2$	room	17.08	-	-	-	pulse photol.	[112]	1376
$CN + NO \rightarrow NOCN$	room	12.3	-	-	-	pulse photol.	[112]	
$CN + C_2H_4 \rightarrow CNC_2H_4$	room	≥ 15.15	-	-	-	pulse photol.	[1223]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
NO + para-H_2 =	193–600	-	-	0	0.15	therm.	[522]	
= ortho-H_2 + NO	"	-	-	0	-0.64	"	"	1463
NO + H_2 = HNO + H	-	-	14.49	0	57.9	-	[1288]	
NO + ortho-D_2 =	193–600	-	-	0	0.15	therm.	[522]	
= para-D_2 + NO	"	-	-	0	-0.64	"	"	1463
NO + NO = N_2 + O_2	1370–1535	-	12.41_4	0	63.8±0.6	therm.	[899, 894]	1464
	1673–2073	-	13.49	0	63.1	"	[1659]	
	3000–4300	-	23.68	-5/2	85.5	shock	[582]	
	1370–4300	-	14.23±0.53	0	74.72±4.44	-	-	1465
	"	-	14.13±0.17	0	75.63±1.43	-	-	1466
NO + NO = N_2O + O	1525–1912	-	14.34	0	78.2	therm.	[1629]	
NO + N_2O = NO_2 + N_2	924–1028	-	14.40	0	50.0	therm.	[898]	1467
	1500–2200	-	14.30	0	50.0	shock	[557]	
NO + $N^{15}O_2$ = NO_2 +	238	> 6	-	-	-	therm.	[990]	
+ $N^{15}O$								
NO + NO_3 = NO_2 + NO_2	room	14.08	-	-	-	pulse photol. NO_2	[810]	
	298	12.53	-	-	-	photol. NO_2	[570]	
	300	12.43	-	-	-	photol.	[572]	
	452–547	-	13.78	0	1.4±2.5	shock	[1377]	723
	473–703	-	12.62	0	1.7±1.0	therm.	[40]	1468
	298–547	-	14.17_5 ± ± 0.14	0	2.31±0.23	-	-	1469
NO + HNO = N_2O + OH	room	< 7.0	-	-	-	photol.	[433]	
	-	-	12.79	0	34.1	-	[1288]	
NO + NO_2Cl = NOCl +	274–344	-	11.92	0	6.9±0.3	therm.	[587]	
+ NO_2	"	-	10.73	1/2	6.6±0.3	"	[587, 1712]	
NO + CO_2 = NO_2 + CO	500–800	-	12.30	0	81.6	from k_ and K	[244]	1470
NO + O_3 = NO_2 + O_2	198 and 230	-	11.90	0	2.5±0.3	therm.	[853, 850]	
	"	-	10.80	1/2	2.3±0.3	"	[853, 1712]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	216-322	-	11.78	0	2.46±0.15	therm., flow	[398, 710]	1471
	"	-	11.62±0.10	0	2.33±0.15	"	[398, 370]	
	245-345	-	12.07_5	0	2.55±0.22	therm.	[1056]	
	298	10.09±0.11	-	-	-	therm., flow	[1241, 1242]	
	300	10.45	-	-	-	photol. NO_2	[571, 572]	1472
	198-322	-	11.83±0.15	0	2.45±0.17	-	-	1473
$NO + O_3 = NO'_2 + O_2$	216-322	-	~11.7	0	4.18±0.30	therm., flow	[398]	
	"	-	11.94±0.24	0	4.2	"	[1492, 710]	
	"	-	11.87±0.09	0	4.18±0.3	"	[398, 370]	
$NO + F_2 = NOF + F$	195-300	-	11.78	0	1.5±1.0	diff. fl.	[1303]	
$NO + Cl_2 = NOCl + Cl$	430.5	2.40±0.17	-	-	-	therm.	[47]	
	450.5	2.89±0.17	-	-	-	"	"	
	470.5	2.96±0.18	-	-	-	"	"	
	523-673	-	12.60	0	20.3	"	[44]	
	"	-	11.00	1/2	19.6	"	[44, 1712]	
	430-673	-	12.44±0.44	0	19.915± ± 0.98	-	-	1474
$NO + ClO_2 = NO_2 + ClO + 14.2$	294	≥ 11.7	-	-	-	therm.	[408]	1475
$NO + NH_3 = ?$	990-1150	-	-	-	-	therm.	[1630]	
$NO + XeF_2 = NOF + XeF$	300-350	-	9.76_3	0	10.0	therm.	[858]	
$NO + XeF_4 = NOF + XeF_3$	300-350	-	8.57_7	0	7.0	therm.	[858]	
NO + 1,3-cyclohexadiene = $HNO + C_6H_7$	580-632	-	11.7±0.2	0	30.6±0.6	therm.	[1397]	
$NO + (CH_3)_2CHO = HNO + (CH_3)_2CO$	299-453	-	-	-	-	pyr. (iso-$C_3H_7O)_2$	[1031]	1477
$NO + CCl_3CHO = HNO + CCl_3CO$	629-694	-	13.5	0	37.1	therm.	[1548]	
$NO + CF_3OOCF_3 = ?$	298-401	-	12.20	0	18.1	therm.	[748]	
$NO + NO + H_2 = 2HNO$	700-825	-	12.80	0	26.1	therm.	[774]	1478, 1479, 1480

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$NO + NO + O_2 = 2NO_2$	143-273	-	8.81	0	-1.51	therm.	[1063]	
	273-338	~10.0	-	-	-	-	[1517]	1482
	273-363	-	~ 9.12	0	~-1.4	therm.	[205]	
	273-662	-	~ 9.5	0	~-0.97	-	[199]	
	293	10.0±0.02	-	-	-	therm.	[678]	1445,1484, 1485
	293-372	-	9.29	0	-0.95	"	[679]	
	"	-	~17.4	-3	0	"	"	
	293-843	-	-	0	-1.75	"	[1506]	1486
	room	10.26	-	-	-	-	[727]	
	296	10.19±0.03	-	-	-	therm.	[630]	
	298	9.78	-	-	-	"	[1414]	
	"	9.87±0.01	-	-	-	"	[244]	
	299	9.95±0.05	-	-	-	therm., flow	[254]	
	478	9.49±0.01	-	-	-	therm.	[1138]	
	658	9.31	-	-	-	therm.	[411]	
	800	9.63	-	-	-	"	"	
	143-400	-	8.8	0	-1.5	-	[1524]	1481
	143-660	-	9.07±0.17	0	-1.33± ±0.21	-	-	1488
$NO + NO + Cl_2 = 2NOCl$	243-363	-	10.4	0	4.2	-	[1524]	1489
	248-476	-	-	-	-	therm.	[1579]	1490
	273-373	-	10.82	0	4.46	"	[927]	
	273 and 434	-	11.21	0	4.86	"	[1516]	1491
	273-470	-	10.41	0	4.60	"	[961]	
	282-386	-	10.76	0	4.5	"	[1513]	1492, 1491
	290	7.47	-	-	-	"	[1515]	1491
	373-523	-	11.40	0	6.0	"	[47]	1493, 1494
	423-524	-	10.50	1/2	6.86	"	[1579, 1561]	1495
	273-523	-	10.92±0.37	0	5.25±0.63	-	-	1496
$NO + NO + Br_2 = 2NOBr$	264-290	-	10.6	0	1.6	therm.	[961,1514]	1497
$NO + NO_2 + H_2O = 2HNO_2$	297	-	-	-	-	therm.	[1567]	
$NO + NO + CH_3NO \rightarrow H_3C - NO(NO) - NO$?	291 ± 2	> 5.11	-	-	-	photol. CH_3I	[352]	
$NO + NO + CF_3NO = CF_3 + N_2 + NO_3$	297	5.75	-	-	-	photol.	[739]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$NO + NO + CH_3CONO =$ $= CH_3CO + N_2 + NO_3$	294-323	-	-	-	-	photol. CH_3COCH_3	[360]	1498
$NO + O_2 + NO_2 = NO_3 +$ $+ NO_2$	298	7.82	-	-	-	therm.	[1304]	
	473-703	-	7.32	0	-1 ± 1	"	[40]	
$NO + NO_2 + H_2O =$ $= 2HNO_2$	298	13.91	-	-	-	therm.	[1576]	
$NO + O_2 \rightarrow NO_3$	658-800	-	-	-	-	therm.	[412]	1499
$NO + C_2H_5 \rightarrow C_2H_5NO$	903	9.2	-	-	-	therm.	[177]	
$NO + CH_3CO \rightarrow CH_3CONO$	294-333	-	-	-	-	photol. CH_3COCH_3	[360]	1500
	308-328	~11.3	-	-	-	therm.	[361]	
$NO + CH_3NO \rightarrow$ $\rightarrow CH_3(NO)_2$?	291 ± 2	1.45	-	-	-	photol. CH_3I	[352]	
$NO + (CH_3)_2N \rightarrow$ $\rightarrow (CH_3)_2NNO$	523	~11	-	-	-	pyr.	[654]	1501
$NO + Ar = N + O + Ar$	3000-4300	-	15.84	0	150	shock	[582]	
	3000-8000	-	20.60	-3/2	150	"	[1638, 1634]	1502, R
$NO + NO = N + O + NO$	3000-8000	-	21.90	-3/2	150	shock	[1638]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$NO_2 + H_2 = NO + H_2O + 44$	657-707	-	9.38	0	18.5	therm.	[412]	
$NO_2 + CO = NO + CO_2$	498-563	-	13.11	0	31.0	therm.	[244]	
	498-800	-	11.68	0	27.8	"	"	1503, 1504
	540-727	-	13.08	0	31.6	"	[852]	1505
	657-800	-	13.11_4	0	32.2	"	[288, 412]	1506, 1507
	666-746	-	11.8	0	27.7±0.4	"	[1488]	
	500-800	-	12.28±0.27	0	29.26±0.77	"	-	1508
$NO_2 + F_2 = NO_2F + F$	301-343	-	12.20±0.12	0	10.47±0.18	therm.	[1231]	
$NO_2 + HCl = HNO_2 + Cl$	373-693	-	11.6	0	23.4	therm.	[1343]	
	633	3.57_6	-	-	-	"	[625]	
$NO_2 + HBr = HNO_2 + Br$	373-693	-	11.0	0	13.0	therm.	[1343]	
$NO_2 + NO_2 = NO_3 + NO$	300	$\bar{5}.3$	-	0	23	shock	[1377]	1509
	473-703	-	11.89±0.25	0	23.9±0.6	therm.	[40]	
	707	4.78	-	-	-	shock	[1377, 440]	
	"	~4.42	-	-	-	therm.	[45]	
	-	-	-	0	~30	-	[46]	1510
$NO_2 + NO_2 = 2NO + O_2$	470-662	-	12.25	0	26.6	therm.	[203]	
	"	-	10.60	1/2	25.07	" from k_ and K	[203, 883]	
	"	-	10.60	1/2	25.1	from k_ and K	[883]	
	473-823	-	12.60±0.4	0	26.9±0.1	therm.	[40]	
	592-656	-	11.12	1/2	26.56	"	[203, 883]	
	"	-	12.69	0	27.1	therm.	[202,203, 40]	
	630-1020	-	12.60	0	26.9	"	[1340]	
	707	4.29	-	-	-	"	[45]	
	1400-2300	-	13.40	0	25 ± 5	shock	[807]	1511
	1500-2100	-	-	-	-	"	[555]	1512
	2000	~ 9	-	-	-	"	[776]	
	473-1020	-	12.61±0.04	0	26.91±0.12	-	-	1513
$NO_2 + O_3 = NO_3 + O_2$	286-302	-	12.77	0	7.0±0.6	therm.	[859]	
	300	7.29	-	-	-	"	[571]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$NO_2 + SO_2 = SO_3 + NO$	434-504	-	~14.14	0	~26.5	therm.	[1713]	1504
$NO_2 + NH_3 = HNO_2 + NH_2$	572-795	-	12.7	0	27.5	therm., stat.	[1341]	
$NO_2 + N_2H_4 = HNO_2 + N_2H_3$	810-880	-	15.83	0	26.7	therm.	[1362]	
$NO_2 + CH_4 = HNO_2 + CH_3$	-	-	9.0	0	21.0	therm.	[719]	
	673-773	-	-	0	22.74	"	[1768]	
$NO_2 + CH_3CO = CH_3 + CO_2 + NO$	308-328	~12	-	-	-	therm.	[361]	
$NO_2 + CH_3CHO = HNO_2 + CH_3CO$	293-353	-	9.2	0	12.6	therm.	[361]	
	391-416	-	12.85	0	16.0	"	[1073]	1504
$NO_2 + CHOCHO = HNO_2 + CHOCO$	448-478	-	11.9	0	19.8	therm.	[1487]	1504
$NO_2 + HCOOH = ?$	464	2.17±0.03	-	-	-	therm.	[109]	
$NO_2 + HCOOD = ?$	464	2.02±0.02	-	-	-	therm.	[109]	
$NO_2 + DCOOH = ?$	464	1.99±0.03	-	-	-	therm.	[109]	
$NO_2 + DCOOD = ?$	464	1.86±0.02	-	-	-	therm.	[109]	
$NO_2 + COCl = CO_2 + NO + Cl$	654-746	-	11.84	0	-0.16±0.25	therm.	[1488]	
$NO_2 + NOCl = NO_2Cl + NO$	573	6.82	-	-	-	-	[39]	1514
$NO_2 + XeF_2 = NO_2F + XeF$	350	< 1	-	-	-	therm.	[858]	
$NO_2 + XeF_4 = NO_2F + XeF_3$	350	< 1	-	-	-	therm.	[858]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$NO_2 + CH_2Cl_2 = HNO_2 +$ $+ CHCl_2$	562-653	-	-	-	23.8±0.2	therm.	[618]	1515
$NO_2 + CHCl_3 = HNO_2 +$ $+ CCl_3$	545-595	-	-	-	28.3±0.2	therm.	[618]	1515
$NO_2 + NO_2 = N_2O_4$	298	-	11.7	-	-	therm.	[322, 333]	1516
$NO_2 + NO_3 \rightarrow N_2O_5$	293-303	-	-	-	-	therm.	[779]	1517
	303-313	-	-	-	-	"	[780]	1518
$NO_2 + C_2H_4 \rightarrow$	433-493	-	-	0	12.5	-	[406]	1504
$\rightarrow NO_2C_2H_4$	493-553	-	-	0	18.0	-	"	
$NO_2 + C_2H_2 \rightarrow$ $\rightarrow NO_2C_2H_2$	443-493	-	11.8	0	15.0	therm.	[1486]	1504
$NO_2 + HCHO =$	391-433	-	10.1	0	15.1	therm.	[1251]	1504
$= HCHO.NO_2$	433-457	-	12.0	0	19.0	"	"	1519
$NO_2 + Ar = NO + O +$	1400-2300	-	16.17_6	0	65.4	shock	[807]	
$+ Ar$	1400-2300	-	21.78	-3/2	71.4	"	[807, 776]	
	"	-	21.58	"	"	from k_- and K	[807]	1520
	1500-2100	-	-	-	-	shock	[555]	1521
	1860-2200	-	16.07_2	0	65.9	"	[776]	
	"	-	21.67	-3/2	72.0	"	"	
$NO_2 + O_2 = NO + O +$ $+ O_2$	1600-2000	-	-	-	-	shock	[558]	1522

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$NO_3 + CO = NO_2 + CO_2$	298-538	-	12.98	0	6.46	therm.	[244]	1523
$NO_3 + NO_3 = 2NO_2 + O_2$	550-1100	-	12.41_4	0	7.7±1.0	shock	[1377]	
$NO_3 + NOCl = NO_2Cl + NO_2$	313	7.84	-	0	~6	therm.	[855, 851]	
$NO_3 + N_2 = NO_2 + O + N_2$	1400-2300	-	25	-2	49.6	shock	[807]	1524
$NO_3 + NO_2 = NO + O_2 + NO_2$	473-703	-	11.07	0	3.2±1.0	therm.	[40]	1468
	-	-	11.23	0	3.9	shock	[440]	1525
	500-1100	-	11.36	0	4.4±0.7	"	[1377]	
	"	-	11.28±0.10	0	3.95±0.22	-	-	1526

REACTIONS OF
SATURATED MOLECULES AND
ELECTRONICALLY EXCITED PARTICLES

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H_2 + D_2 = 2HD$	1060–1420	–	12.84	1/2	42.26	shock	[126]	1527
para-$H_2 + O_2 = O_2 +$	86–373	–	2.38	0	0.27	therm.	[524,520,522]	1528
= + ortho-H_2	293	2.14	–	–	–	"	[520]	
$H_2 + O_2 = OH + OH$	~758	–	14.92	0	45	fl.	[1763]	
	960–1080	–	14.40	0	67.0	comp.	[1408]	1529, 1530
	1400–2500	–	12.4	0	39	shock, comp.	[1326]	
$H_2 + F_2 = HF + HF$	–	–	–	0	~30	–	[1228, 1287]	
	–	–	–	0	> 25	–	[1209, 1228]	
	–	–	–	0	≥ 15	diff. fl.	[1733]	1531
$H_2 + Cl_2 = HCl + HCl$	–	–	–	0	> 36	–	[1209]	
$H_2 + I_2 = HI + HI$	633–738	–	12.78	1/2	40.74	therm.	[1446]	1532, 1533
$H_2 + CO_2 = OH + HCO$	–	–	11.38	1/2	95.76	calc.	[1290]	
$H_2 + HCl = HCl + H_2$	821–984	–	–	0	57±4	therm., $p \to 0$	[1434]	
$H_2 + DCl = HD + HCl$	752–823	–	10.85	1/2	53.4	therm.	[1436]	
$H_2 + HBr = HBr + H_2$	821–984	–	–	–	–	therm., $p \to 0$	[1434]	1534
$H_2 + HI = HI + H_2$	693–753	–	13.82	0	44±3	therm., $p \to 0$	[1435, 1338]	1535
$H_2 + C_2H_2 = C_2H_3 + H$	1180–1774	–	12.7	0	60.7	therm.	[151]	
	1200–1700	–	13.0	0	60.6	"	[152]	
$H_2 + C_2H_4 = C_2H_6$?	748–823	–	12.80	0	43.15	therm.	[1226]	
$H_2 + C_2H_4 \rightarrow C_2H_6$	823	–	–	–	–	therm.	[1594]	1536
$H_2 + C_2H_2 = C_2H_4$	768–808	–	12.76	0	42.0	therm.	[1471]	
	788	1.4	–	–		"	"	
$H_2 + H = H + H + H$	3000–4500	–	18.08	–1/2	103.25	shock	[602]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H_2 + Ar = H + H + Ar$	300-4000	-	$16.91 \pm 0.06 + \lg(1-e^{6000/T})$	-1/2	103.24	-	[1737]	1537
	960-1080	-	22.54	- 2	108.0	comp.	[1408]	1538, 1529
	2290-3790	-	12.33	1/2	92.6	shock	[1173]	
	2900-4700	-	18.62	-1.025	103.24	"	[829]	
$H_2 + Xe = H + H + Xe$	1750-2750	-	21.00	-3/2	103.24	-	[488]	1539
	3000-4500	-	17.25_5	-1/2	103.25	shock	[602]	
$H_2 + H_2 = H + H + H_2$	300-3500	-	$17.47 + \lg(1-e^{-6000/T}) \pm 0.20$	-1/2	"	from k_- and K	[1737]	
	3000-4500	-	20.25_5	-3/2	103.25	shock	[602]	
$H_2 + H_2O = H + H + H_2O$	960-1080	-	23.84	- 2	108.0	comp.	[1408]	1191
ortho-$D_2 + O_2 = O_2 +$ para-D_2	83-293	-	1.20	0	0.105	therm.	[520, 522]	
$D_2 + I_2 = DI + DI$	633-800	-	12.50	1/2	40.79	therm.	[1450]	1532
$D_2 + HCl = HD + DCl$	765-843	-	13.80	1/2	26.2	therm., stat.	[690]	
	783-900	-	12.1	1/2	57.4	therm.	[1436]	1540
$D_2 + HBr = DBr + HD$	821-984	-	-	-	-	therm.	[1434]	
$D_2 + H_2S = HD + HDS$	1260-1590	-	-	-	-	shock	[262]	
$D_2 + NH_3 = DH + NH_2D$	1300-1700	-	-	-	-	shock	[1007]	
$D_2 + CH_4 = HD + CH_3D$	1440-1755	-	-	0	52.0 ± 2.2	shock	[1575]	
$D_2 + C_2H_2 =$ (H-D)-exchange	1000-1500	-	-	-	-	therm.	[125]	
$D_2 + C_2H_4 = C_2H_3D + HD$	1260-1560	-	-	-	-	shock	[124]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$D_2 + C_2H_2 \rightarrow C_2HD + HD$ and $C_2D_2 + H_2$	1300–1665	–	–	–	–	shock	[124, 971, [846]	1541
$N_2 + O_2 = NO + NO$	1400–4300	–	24.96	-5/2	128.5	–	[899, 582, 1634, 76, 1578]	
$N_2 + N = N + N + N$	3000–8000	–	22.61_3	-3/2	224.9	shock	[1638]	1542, 1543
	6000–9000	–	22.63_3	-3/2	224.9	"	[276]	
	6000–10000	–	19.85	- 1	"	"	[325]	
	"	–	22.47_7	-3/2	"	"	[325, 276]	
	8000–15000	–	22.18±0.17	-1.6	224.8	"	[32]	
$N_2 + Ne = N + N + Ne$	6000–10000	–	19.72_4	- 1	224.9	shock	[325]	
$N_2 + Ar = N + N + Ar$	6000–9000	–	17.27_8	-1/2	224.9	shock	[276]	1543
	6000–10000	–	16.77_8	-1/2	"	"	[325, 276]	
	"	–	19.41_4	- 1	"	"	[325]	
	8000–15000	–	21.14±0.04	-1.6	224.8	"	[32]	
$N_2 + N_2 = N + N + N_2$	3000–8000	–	17.57_7	-1/2	224.9	shock	[1638]	1542,1543
	6000–9000	–	17.68	-1/2	"	"	[276]	
	6000–10000	–	21.68	-3/2	"	"	[325, 276]	
	"	–	22.75	-1.7	"	"	[325]	
	8000–15000	–	$21.55±0.11_5$	-1.6	224.8	"	[32]	
$N_2 + M = N + N + M$	3000–8000	–	17.28_4	-1/2	224.9	shock	[1638]	1542,1544
$O_2 + SO = SO_2 + O$	440–530	–	13.3±0.3	0	10.0±1.0	dis., flow	[1615]	
$O_2 + HBr = HO_2 + Br$	700–800	–	12.5	0	37.7	therm.	[1342]	
$O_2 + CH_4 = HO_2 + CH_3$	1500	12.10±0.15	–	–	–	shock	[770]	
	1585–1850	–	–	0	52.9±4.6	"	[38]	1545
$O_2 + HCHO = H_2 + CO_2 + O$ (?)	900–1350	–	–	0	20.6±1.9	shock	[38]	1546
$O_2 + O = O + O + O$	2800–5000	–	18.05	-1/2	118.0	shock	[275]	1547, R
	5000–7500	–	19.95	- 1	"	"	[303]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O_2 + Ar = O + O + Ar$	2800-5000	-	16.71	-1/2	118.0	shock	[275]	
	3400-7500	-	18.55±1.00	- 1± ±0.2	"	"	[303]	
	4200-7000	-	18.33_7	- 1	"	"	[1716]	
	5000-11000	-	14.46	0	"	"	[1635]	
	5000-18000	-	16.40	-1/2	"	"	[1636]	
	"	-	18.38	- 1	"	"	"	
	300-18000	-	$15.04 + \lg(1 - e^{-2200/T})$	0	"	-	[1636, 957]	
$O_2 + Xe = O + O + Xe$	1750-2750	-	21.00	-3/2	117.96	-	[488]	
$O_2 + N_2 = O + O + N_2$	3000-8000	-	18.86	- 1	118.0	shock	[1638]	1548
$O_2 + O_2 = O + O + O_2$	2600-7000	-	28.76	-7/2	118.0	shock	[617, 1742]	
	2800-3900	-	21.29	-3/2	"	"	[275, 303]	1547
	3000-5000	-	25.05_4	-5/2	"	"	[1065]	
	3000-8000	-	19.51	- 1	"	"	[1638]	1549
	4000-7000	-	25.03	-5/2	"	"	[1716]	
	6000-7000	-	19.03±0.95	-1 ± ±0.2	"	"	[303]	1550
	2600-7000	-	25.36±1.37	-2.6± ±0.4	118.0	shock	-	1551
$O_2 + CO_2 = O + O + CO_2$	2400-3000	-	13.9±0.46	0	39 ± 7	shock	[1457]	1552
$O_2 + M = O + O + M$	3500-7000	-	18.56	- 1	118.0	shock	[1716]	1553
$O_3 + O_3 = 3O_2$	343-373	-	12.65	0	18.8	therm.	[1761]	
	343-383	-	13.68	0	24.0±0.5	"	[632]	1675,1554
$O_3 + CH_4 = ?$	308-340	-	10.16	0	13.9	therm.	[463]	
	"	-	11.21	0	15.35	"	"	1555
$O_3 + C_2H_4 = C_2H_4O + O_2$ or $\rightarrow C_2H_4O_3$	303-323	5.54	-	-	~0	therm.	[283]	
$O_3 + C_2H_2 = ?$	303-323	-	7.47_7	0	4.8	therm.	[284]	
O_3 + 1-hexene = $= C_6H_{12}O + O_2$ or $\rightarrow C_6H_{12}O_3$	281-300	6.75	-	-	~0	therm.	[283]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O_3 + C_2F_4 \rightarrow C_2F_4O_3$	room	6.91	-	-	-	therm.	[740]	
$O_3 + C_3F_6 \rightarrow C_3F_6O_3$	room	7.11	-	-	-	therm.	[740]	
$O_3 + (CF_3CF)_2 \rightarrow$ $\rightarrow (CF_3CF)_2O_3$	room	6.04	-	-	-	therm.	[740]	
$O_3 + N_2 = O_2 + O + N_2$	689–863	-	14.39	0	21.9	shock	[869]	1556
	343–863	-	14.76±0.05	0	23.15± ±0.30	-	"	502
$O_3 + O_2 = O_2 + O + O_2$	343–373	-	15.30	0	24.0	therm.	[144]	
	343–863	-	14.89	0	23.34	-	1731	1557
$O_3 + O_3 = O_2 + O + O_3$	343–383	-	15.66±0.02	0	24.0	therm.	[144]	1558
	343–403	-	15.92_9	0	24.4	"	[1382]	
	388–403	-	15.90	0	24.3	"	[1660, 991]	
$F_2 + HI = F + HF + I$	298	7.08	-	-	~5	diff. fl.	[1762]	
$F_2 + HBr = F + HF + Br$	298	7.08	-	-	-	diff. fl.	[1762]	
$F_2 + C_2H_4 = C_2H_4F + F$	298–430	-	10.70	0	4.5±0.3	diff. fl.	[1734]	
$F_2 + Ne = F + F + Ne$	1400–2000	-	16.3	0	35.0	shock	[461]	
$F_2 + Ar = F + F + Ar -$ $- 38.5$	1300–1700	-	15.49	0	27.3	shock	[1386a]	1560
$F_2 + M = F + F + M$	1000–1600	-	12.49	0	27.3±2.5	shock	[1386]	1561
	"	-	13.14_6	0	31.12	"	"	1562
	"	-	11.56_8	0	19.58	"	"	1563
	1300–1600	-	12.85	0	30 ± 4	"	[849]	1564
	1300–2670	-	-	0	27	"	[459, 849, 1287]	
	1665–2670	-	12.18	0	23.9	"	[459]	1565
	-	-	10.23	0	14 ± 3	-	[1287]	1566
$Cl_2 + O_3 = ClO + ClO_2 -$ $- 14.7$	288–333	-	13.9	0	26	therm., est.	[713]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$Cl_2 + Cl = Cl + Cl + Cl$	3500–5200	–	–	–	–	shock	[831]	1567
$Cl_2 + M = Cl + Cl + M$	600–1500	–	14.0	0	47	shock	[1714]	1568
	1550–2650	–	14.99	0	48	"	[775]	1569
	"	–	20.96	-3/2	57.06	"	[775]	1570,1571
	1600–2600	–	13.66	0	45 ± 2	"	[1542]	1572
	1700–2500	–	13.95	0	48.3	"	[827]	1573
	"	–	21.80	-2.087	57.08	"	"	"
	1710–3190	–	–	0	41 ± 5	"	[462]	1574, 1575, 1576
	"	–	23.93	-5/2	57.1	"	"	
	1738–2582	–	13.94	0	48.3	"	[317]	1577
	1600–2650	–	20.38 + lg $(1-e^{-814/T})$	-3/2	57.06	"	–	1578
$Br_2 + Ar = Br + Br + Ar$	1200–1900	–	11.34	1/2	31.5	shock	[1574]	
	1310–2225	–	11.40	1/2	30.69	"	[1218]	
	"	–	23.28	-3.96	45.5	"	"	
	298–2225	–	19.73	-1.47	45.5	"	"	1579
$Br_2 + Ne = Br + Br + Ne$	1200–1900	–	11.26	1/2	31.3	shock	[1574]	
$Br_2 + Kr = Br + Br + Kr$	1200–1900	–	11.63_5	1/2	33.6	shock	[1574]	
$Br_2 + O_2 = Br + Br + O_2$	–	–	16.47_6	-0.5	44.81	–	[305]	186
$Br_2 + Br_2 = Br + Br + Br_2$	1010–1610	–	23.46	-5/2	45.5	shock	[1218]	
	1200–2225	–	11.43	1/2	29.21	"	"	
	"	–	32.67	-5.44	45.5	"	"	
	–	–	16.61_4	-0.40	44.04	–	[305]	186
$Br_2 + M = Br + Br + M$	1500–1900	–	10.70_9	0	37.6	shock	[848]	1580
	1300–1900	–	–	–	–	"	[232]	1581
	1400–2700	–	–	–	–	"	[236]	1582
	–	–	18.16	-1/2	46.05_3	–	[306]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$I_2 + He = I + I + He$	-	-	16.49_1	0	35.5	pulse photol.	[1346]	1583
$I_2 + Ne = I + I + Ne$	-	-	16.51_8	0	35.5	pulse photol.	[1346]	1583
$I_2 + Ar = I + I + Ar$	-	-	16.81_2	0	35.5	from k_- and K	[1346]	1583,1584
	-	-	16.04	0	35.5	"	[1054]	1585
	1060–1860	-	22.07_4	-2.3	35.54	shock	[234]	
$I_2 + H_2 = I + I + H_2$	-	-	16.93_4	0	35.5	pulse photol.	[1346]	1583
$I_2 + N_2 = I + I + N_2$	-	-	16.91_3	0	35.5	pulse photol.	[1346]	1583
$I_2 + O_2 = I + I + O_2$	-	-	17.08	0	35.5	pulse photol.	[1346]	1583
$I_2 + CO_2 = I + I + CO_2$	-	-	17.38	0	35.5	pulse photol.	[1346]	1583
$I_2 + CH_4 = I + I + CH_4$	-	-	17.20_4	0	35.5	pulse photol.	[1346]	1583
$I_2 +$ n-$C_5H_{12} = I + I +$ + n-C_5H_{12}	-	-	17.93	0	35.5	pulse photol.	[1346]	1583
	-	-	17.25_5	0	35.5	pulse photol.	[1054]	1585
$I_2 + (CH_3)_4C = I + I +$ + $(CH_3)_4C$	-	-	17.20_4	0	35.5	pulse photol.	[1054]	1585
	-	-	17.89_2	0	"	"	[1346]	1583
$I_2 +$ cyclo-$C_6H_{12} = I +$ + I + cyclo-C_6H_{12}	-	-	17.98_6	0	35.5	pulse photol.	[1346]	1583
$I_2 + C_6H_6 = I + I +$ + C_6H_6	-	-	18.18_7	0	35.5	pulse photol.	[1346]	1583
$\dot{I}_2 + M = I + I + M$	1000–1600	-	-	-	-	shock	[238, 237]	1586
$HF + Ar = H + F + Ar$	3800–5300	-	19.05_3	-1	134.1	shock, from k_- and K	[828]	1587
	"	-	22.71	-2	"		"	
$HF + M = H + F + M$	3700–6100	-	18.67	-1	134.1	shock	[184]	1588
$HCl + NH_3 \rightarrow NH_4Cl$	-	-	-	-	0	calc.	[367]	
$HCl + Ar = H + Cl + Ar$	2800–4600	-	12.82	0	70	shock	[826]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	2800–4600	-	21.88	-2	102.17	shock	[826]	1589
	2900–4000	-	13.62	0	81.0	"	[1385]	
	"	-	18.54	-1	102.2	"	"	1590
	3300–5400	-	11.28_3	1/2	69.7	"	[554]	
$HBr + C_2F_4 = C_2F_4Br + H$	970–1300	-	16.96	0	54.56	shock, comp.	[1409]	
$HI + HI = H_2 + I_2$	556–781	-	12.31	1/2	43.71	from k_ and K	[192]	1591
	"	-	13.9	0	44.0	"	"	
	633–738	-	11.97	1/2	43.71	"	[1446]	R
	667	$\bar{1}.41$	-	-	-	therm.	[1469]	
	696–779	-	13.00_1	1/2	45.9	therm., stat.	[225]	
	699	0.09_4	-	-	-	therm.	[1469]	
$HI + CH_3I = I_2 + CH_4$	543–593	-	13.93	1/2	33.4	therm.	[1192]	
	"	-	14.3	0	33.4	"	[1192, 1524]	1592
$HI + C_2H_5I = I_2 + C_2H_6$	523–573	-	13.34	1/2	29.8	therm.	[1192]	
	"	-	13.7	0	29.8	"	[1192, 1524]	1592
$HI + n\text{-}C_3H_7I = I_2 + C_3H_8$	533–573	-	12.75	1/2	29.2	therm.	[1192]	
	"	-	14.1	0	29.2	"	[1192, 1524]	1592
$HI + C_2H_4 \rightarrow C_2H_5I$	562–652	-	11.52	0	28.9	therm.	[146]	
$HI + C_3H_6 \rightarrow iso\text{-}C_3H_7I$	482–522	-	10.89	0	23.4	therm.	[206]	
	581–613	-	10.5	0	23.7	"	[153]	
$HI + C_4H_8\text{-}2 \rightarrow sec\text{-}C_4H_9I$	565–606	-	9.26	0	21.1±0.4	therm.	[1175]	
$HI + C_4H_8 + I = sec\text{-}C_4H_9I + I$	565–606	-	11.11±0.37	0	1.5±1.0	therm.	[1175]	
$HI + iso\text{-}C_4H_8 \rightarrow tert\text{-}C_4H_9I$	474–518	-	9.50±0.15	0	18.0±0.5	therm.	[207]	1593

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$HI + C_2H_3Cl \rightarrow C_2H_4ClI$	525 and 566	-	-	-	-	therm.	[207]	1145
$DCl + Ar = D + Cl + Ar$	2800–4600	-	21.90	-2	103.2	shock	[826]	
$DI + DI = D_2 + I_2$	660–719	-	11.80	1/2	42.7	therm.	[180]	1594
	667	$\bar{1}.22_5$	-	-	-	"	[1469]	
	696–779	-	12.91_4	1/2	46.4	therm., stat.	[225]	
	699	$\bar{1}.89$	-	-	-	therm.	[1469]	
	-	-	12.22	1/2	48.0	"	[1469]	
$DI + CH_3I = I_2 + CH_3D$	528 and 583	-	-	-	-	therm.	[1178]	1595
$CO + O_2 = CO_2 + O$	1190-1850	-	10.38	0	30.4	shock	[487a]	416
	1550–3330	-	12.40	0	48.0	fl.	[242]	
	1400–3000	-	12.49±0.21	0	51 ± 7	shock	[1457]	
$CO + Cl_2 = COCl + Cl$	298–328	-	11.50	1/2	51.3	photochem., from k_- and K	[268, 1712]	
$CO_2 = CO + O$	2800–3500	-	~11.3	0	111	shock	[1201]	
	2800–3700	-	11.4	0	110	"	[1200]	
$CO_2 + Ar = CO + O + Ar$	2552–2860	-	11.48	1/2	86	shock	[215]	1833
	2800–4400	-	14.7	0	99.0±2.5	"	[1117, 1732, 1201]	1596
	"	-	32.48	-4.5	127.555	"	[1201]	1597
	3000–5000	-	11.85	1/2	84.5	"	[556]	
	"	-	32.36	-4.57	125.8	"	"	
	3500–6000	-	11.46	1/2	74.1	"	[444]	
	"	-	31.79_4	-4.38	125.7	"	"	
	6000–11000	-	11.06_4	1/2	67.7	"	[445]	1598
	"	-	27.14	-3.21	125.7	"	"	
	2800–11000	-	33.20	-4.77	125.75	"	-	1599
$CO_2 + N_2 = CO + O + N_2$	2800–4400	-	-	0	99.0±2.5	shock	[1117]	
	3000–5000	-	11.72_6	1/2	79.6	"	[556]	
	"	-	34.76	-5.2	125.3	"	"	
	3500–6000	-	11.38_8	1/2	73.9	"	[444]	
	"	-	32.96	-4.22	125.75	"	"	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	3000–6000	–	13.60±0.09	0	81.23±1.68	shock	–	1600
$CO_2 + CO_2 = CO + O +$	3000–5500	–	14.17_6	0	87 ± 9	shock	[1743]	
$+ CO_2$	"	–	36.26	-5.5	126.0	"	[617]	
$N_2O + N_2O = 2N_2 + O_2$	992	$\bar{6}.57$	–	–	–	therm.	[1170]	
$SO + O_3 = SO_2 + O_2$	222–300	–	12.17_6	0	2.1±0.4	dis., SO_2	[1492, 709]	
	275–323	–	12.3	–	–	"	[710]	
$SO + O_3 = SO_2^*(^1B) + O_2$	275–323	–	11.6	0	4.2	dis., SO_2	[1492, 709, 710]	
$SO + O_3 = SO_2^*(^3B) + O_2$	275–323	–	–	0	3.9	dis., SO_2	[1492, 709]	
$SO + SO = SO_2 + S +$	room	< 10	–	–	–	mass spect.	[806]	
$+ 5.8$	"	12.41	–	–	–	dis.	[1455]	
$SO_2 + SO_2 = SO_3 + SO$	3000–4000	–	15.0	0	70 ± 7	shock	[1197]	1601
$SO_2 + Ar = SO + O +$	3000–3980	–	12.5	0	56.0	shock	[609]	1602, 1603
$+ Ar - 129.4$	3000–7000	–	14.4	0	110.0	"	[1732, 1197]	
$SO_3 + Ar = SO_2 + O +$ $+ Ar - 81.7$	1740	8.0	–	–	–	shock	[1177]	
$SO_3 + N_2 = SO_2 + O +$ $+ N_2$	1740	8.9	–	–	–	shock	[1177]	
$COS + Ar = CO + S + Ar$	1975–3120	–	19.6	-1.37	71.5	shock	[736]	1604
$COS + M = CO + S + M$	1800–3000	–	14.7	0	60	shock	[1732]	
$CS_2 = CS + S$	1950–2800	–	12.6	0	87 ± 2	shock	[1200]	
$CS_2 + Ar = CS + S + Ar$	1825–3700	–	15.56	0	80.3	shock	[1197, 1732, 1198]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
	2250–3350	–	15.94	0	81.8	shock	[610]	
	"	–	25.20	–2.5	96.0	"	"	
$CS_2 + CS_2 = CS + S + CS_2$	2250–2350	–	14.22	0	43.7	shock	[610]	
$NH_3 + NH_3 = 2NH_2 + H_2$	2900–9600	–	12.68	0	23.9	shock	[314]	
$N_2H_4 \rightarrow NH_2 + NH_2$	970–1550	–	13.0	0	54 ± 2	shock	[1076, 1118]	
	1070–1420	–	–	0	~ 55	"	[1113]	
$PH_3 + B_2H_6 = PH_3BH_3 + BH_3$	249–273	–	9.47_7	0	11.4±2.0	therm.	[249]	
$H_2O + CO_2 = HO_2 + HCO$	–	–	10.41_5	1/2	146.74	calc.	[1290]	
$H_2O + He = H + OH + He$	1750–2750	–	21	–3/2	114.73	–	[488, 1284]	
$H_2O + Ar = H + OH + Ar$	960–1080	–	24.59_6	–2	123.2	comp.	[1408]	1529
	2600–4300	–	15.3	0	109	shock	[1199]	1605, 1606
	"	–	15.0	0	105	"	"	"
	2700–6000	–	14.7	0	105.0	"	[1201]	R
	"	–	21.23	–1/2	117.6	"	"	1607
	3004–3978	–	15.3	0	109.0	"	[609]	1605
$H_2O + Xe = H + OH + Xe$	1750–2750	–	21.0–23.0	–3/2	114.73	–	[488]	1539
$H_2O + H_2O = H + OH + H_2O$	960–1080	–	25.89_7	– 2	123.2	comp.	[1408]	1529
$H_2O_2 + He = 2OH + He$	705–742	–	16.2±0.9	0	42.5±2.9	therm.	[576]	
$H_2O_2 + Ar = 2OH + Ar$	1000–1400	–	–	–	–	shock	[1113]	
$H_2O_2 + H_2 = OH + OH + H_2$	743–803	–	17.87	0	47.0±0.7	comp.	[91]	41

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$H_2O_2 + N_2 = OH + OH +$	713–833	–	16.93	0	45.5±0.5	therm.	[84]	1608
$+ N_2$	720–950	–	17.23	0	46.8	"	"	1609, R
	743–808	–	17.50	0	47.0±0.7	comp.	[91]	41
	1750–2750	–	26.83	-3	50.1±1.0	–	[488, 1284]	
$H_2O_2 + H_2O_2 = OH + OH +$	705–742	–	19.0±0.9	0	48.1±2.9	therm.	[576]	
$+ H_2O_2$	728–932	–	18.4	0	48.0	"	[785]	1610, 1611, 1612
$H_2O_2 \rightarrow 2OH$	678–878	–	18	0	48	therm.	[624]	1618
$HNO + HNO = H_2O + N_2O$	room	≥ 7.48	–	–	–	dis. $, H_2,$ flow	[878]	
	463	~ 8.95	–	–	–	pyr. iso-C_3H_7ONO	[546]	
$HNO + HNO = NO + NO +$	–	–	10.3	1/2	4.44	–	[1288]	
$+ H_2$								
$HNO + M = H + NO + M$	1800	10.68	–	–	–	fl.	[258]	
	–	–	19.7	-1	49.0	–	[1288]	
$DNO + DNO = D_2O + N_2O$	room	8.58±0.15	–	–	–	Hg photo.	[952]	
$HNO_2 = OH + NO$	–	–	13	0	45	est.	[1288]	
$HNO_3 + Ar = OH + NO_2 +$	650–1200	–	46.8	-7.5	47.3	shock	[724, 854]	
$+ Ar$	800–1200	–	15.2±1.0	0	30.6±1.8	"	[677, 724]	
$2CH_3NO = (CH_3NO)_2$	291±2	4.08	–	–	–	photol. CH_3I	[352]	
$NOCl + NOCl = 2NO +$	373–574	–	11.8	0	22.0	therm.	1579, 1524	
$+ Cl_2$	423–524	–	11.63_3	1/2	24.0	"	[1561]	
	"	–	13.19	0	24.5	"	"	
	"	–	12.5	0	23.4	"	1561, 47	1614, 1615
	"	–	12.7±0.3	0	23.6±0.7	"	[41]	1616, R
	451–566	–	12.78	1/2	25.99	from k_- and K	[1516]	
	1020	8.92	–	–	–	therm.	[1470]	
$NOBr + NOBr = 2NO +$	265–288	–	13.8	0	14.1	therm.	[961, 1524]	1617
$+ Br_2$								

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$NOI + NOI = 2NO + I_2$	333	$\leq$ 10.6	-	-	-	pulse photol.	[1254]	
$B_2H_6 + CH_3PH_2 =$ $= CH_3PH_2BH_3 + BH_3$?	298	-	-	-	-	therm.	[250]	1619
$C_2H_4 + C_2H_4 = C_2H_5 +$ $+ C_2H_3$	839–873 1169–1784	- -	14.82 14.7	0 0	64.0 64.7	therm. "	[211] [151]	
$C_2H_4 + C_2H_4 = C_4H_8$?	623–873	-	11.17_6	0	35.0	therm.	[1225]	1618
C_4H_6-1,3 + C_4H_6-1,3= $= C_8H_{12}$	599–703	-	10.22	0	24.7±1	therm.	[1544, 718]	
C_4H_6-1,3+ acrolein = 1,2,3,6- tetrahydro-benzaldehyde	429–605	-	9.16_4	0	19.7	therm.	[932]	
C_4H_6-1,3 + crotonal-dehyde = 1,2,3,6- - tetrahydro- 0 - toluylaldehyde	515–573	-	8.95_4	0	22 ± 1	therm.	[932]	
$C_4H_6 \rightarrow 2C_2H_3$	1209–1412	-	15.4	0	99.5	therm.	[151]	
$2C_5H_8$ (isoprene) = $= C_{10}H_{16}$	559–644	-	10.34	1/2	28.9	therm.	[1545]	
2 1,3-pentadiene = $= C_{10}H_{16}$	552–692	-	10.54_4	0	26.0	therm.	[718]	
2 2,3-dimethyl butadi-ene-1,3 = $C_{12}H_{20}$	480–673	-	10.16	0	25.3	therm.	[718]	
isoprene + acrolein = = 2,3,4,5- tetrahydro- -M- toluylaldehyde	492–606	-	9.01	0	18.7	therm.	[932]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$C_2H_2 + C_2H_2 = ?$	768–808	–	–	–	–	therm.	[1471]	1620
$C_2H_2 + C_2D_2 = C_2HD + C_2HD$	1150–1450	–	–	–	–	shock	[124, 846]	
2 cyclopentadiene = $C_{10}H_{12}$	353–423	–	9.11_4	0	16.7	therm.	[924]	
	393–467	–	7.98	0	14.9	"	[718, 933]	1621
	405–455	–	9.77_8	0	16.9	"	[958]	
cyclopentadiene + acrolein = 2,5- endomethylene -1,2,5,6- tetrahydrobenzaldehyde	351–483	–	9.17_6	0	15.2±1	therm.	[932, 1120]	
$C_4H_6 + C_4H_6 \rightarrow C_8H_{12}$ (3-vinyl cyclohexene)	446–660	–	9.96	0	23.69	therm.	[934]	
$C_4H_6 + C_8H_{12} \rightarrow C_{12}H_{18}$ (Δ3,3'-octahydrodiphenyl)	446–660	–	14.11	0	38.0	therm.	[934]	
HCHO + HCHO = ?	783–880	–	15.73	0	47.8	therm.	[561]	
	"	–	14.04	1/2	47.0	"	"	
$CH_3CONH_2 + CH_3COOH = ?$	698–817	–	11.32±0.09	0	30.10± ±0.18	photol. acetamide	[51]	
$2CH_3CONH_2 = NH_3 + CH_3COOH + CH_3CN$	698–817	–	11.59±0.40	0	36.2±0.84	photol. acetamide	[51]	1622
$BF_3 + CH_3NH_2 = BF_3NH_2CH_3$	299	11,90	–	–	–	therm.	[606]	1623
$BF_3 + (CH_3)_2NH = BF_3NH(CH_3)_2$	298	13,51	–	–	–	therm.	[606]	1624
$BF_3 + (CH_3)_3N = BF_3N(CH_3)_3$	297	12,57	–	–	–	therm.	[606]	1625
	–	~12	–	–	–	dis., flow	[1402]	
$CF_4 + Ar = CF_3 + F + Ar$	1700–3000	–	34.79	-4.64	122.42	shock, est.	[1133]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CF_3I + Ar = CF_3 + I + Ar$	1700–3000	-	30.35_5	-4.0	57.38_5	shock, est.	[1133]	
$C_2F_6 + Ar = CF_3 + CF_3 + Ar$	1700–3000	-	20.92	1/2	76.5	shock, est.	[1133]	
$CF_2O_2 + C_2F_4 = CF_2O + C_2F_4O$	296	-	-	-	-	photochem.	[745]	1626
	398	-	-	-	-	"	"	"
$CF_2O_2 + C_3F_6 = 2CF_2O + CF_3CF$	297	-	-	-	-	Hg photo.	[1358]	1627
$CF_2O_2 + C_2F_4 = CF_2 + 2CF_2O$	296	-	-	-	-	photochem.	[745]	1628
	398	-	-	-	-	"	"	"
$C_2N_2 + Ar = CN + CN + Ar$	1700–2000	-	~ 17.23	0	~100.4	shock	[871a]	
$CNCl + Ar = CN + Cl + Ar$	2000–2800	-	16.53	0	91.5	shock	[1370]	
$CF_3CN + C_2H_4 \rightarrow CF_3CH_2CH_2CN$	365–445	-	10.0±0.4	0	27 ± 3	therm.	[560]	
$CF_3CN + C_3H_6 \rightarrow CF_3C_3H_6CN$	673–723	-	17 ± 2	0	51.50	therm.	[716]	
$Al(CH_3)_3 \rightarrow CH_3 + Al(CH_3)_2$	571–607	-	-	-	-	therm.	[1648]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$He'(^3S_1) + He + He =$ $= He_2 + He$	77	12.00_5	-	-	-	dis.	[1234]	
	279	13.90	-	-	-	"	[1030]	
	300	13.84	-	-	-	"	[1234]	
	"	13.96	-	-	-	"	[1233]	
	"	14.02	-	-	-	"	[157]	
	"	14.07	-	-	-	"	[1361]	
	366	14.19	-	0	1.55	"	[1030]	
$Xe' + Xe = X_2^+ + e$	4000-9000	-	14.55	1/2	36.2 ± 4.6	shock	[703]	
$O'(^1D) + H_2 = OH + H$	300	14.06	-	-	-	photol. O_2	[1655a]	1233
$O'(^1D) + O_2 + O_2 =$ $= O_3 + O_2$	room	13.86	-	-	-	photol. O_2	[1456]	1629
$O'(^1D) + O_3 = O_2 + O_2$	205-298	≥ 12.36	-	-	-	photochem.	[1417]	
	273-323	-	14.38	0	2.4 ± 1.0	photol. O_2	[1456]	
	room	12.62	-	-	-	"	"	1629
	"	14.24 ± 0.24	-	-	-	pulse photol. O_3	[1418]	
	"	-	-	-	-	photol. CO_2	[1571]	1630
	room	≥ 12.26	-	-	-	pulse photol. O_3	[559]	
$O'(^1D) + H_2O = O_2 +$ $+ H_2$	300	14.03	-	-	-	photol. O_2	[1655a]	1233
$O'(^1D) + H_2O = 2OH$	room	-	-	-	-	photol. O_3	[885]	1631
$O'(^1D) + CH_4 = OH +$ $+ CH_3$	300	14.12	-	-	-	photol. O_2	[1655a]	1233
$O'(^1D) + C_2H_2 = HCO +$ $+ CH$	room	-	-	-	-	pulse photol.	[1150]	
$O'(^1D) + C_2H_6 = OH +$ $+ C_2H_5$ n-$CH_3O + CH_3$	298	-	-	-	-	photol. H_2O	[1167]	
$O'(^1D) + C_3H_8 =$ n-C_3H_7, iso-$C_3H_7 + OH$ $\rightarrow C_3H_7OH$	room	14.32	-	-	-	photol. H_2O	[1643]	1632

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$O'(^1D) + C_2H_4 =$ $= C_2H_3O + H$ and CH_3CHO	298	-	-	-	-	photol. N_2O	[1167]	1633
$O'(^1S) + O \rightarrow O_2$	room	11.03	-	-	-	dis., flow	[1655]	
$O'(^1D) + CO \rightarrow CO_2$	room	12.3	-	-	-	pulse photol. CO_2	[368]	1634
	"	-	-	-	-	"	[369]	1635
$O'(^1D) + CO = CO_2^*$	300	13.48	-	-	-	photol O_2	[1655a]	459
$O'(^1D) + CO_2 \rightarrow CO_3$	room	5.62	-	-	-	photol. CO_2	[1572]	1636
	"	11.08	-	-	-	pulse photol.	[369]	1637
$S'(^1D) + COS = S_2 + CO$	303-496	-	-	-	-	photol COS	[945]	
$S'(^1D) + C_2H_6 \rightarrow$ $\rightarrow C_2H_5SH$	303-496	-	-	-	-	photol COS	[945]	1638
$S'(^1D) + C_3H_8 \rightarrow$ $\rightarrow C_3H_7SH$	303-496	-	-	-	-	photol. COS	[945]	1639
$S'(^1D) +$ cyclo $-C_4H_8 \rightarrow$ $\rightarrow$ cyclo $-C_4H_7SH$	303-496	-	-	-	-	photol. COS	[945]	1640
$Cl'(3^2P_{1/2}) + ICl =$ $= Cl_2 + I$	300	13.26	-	-	-	pulse photol.	[482]	
$Cl'(3^2P_{1/2}) + Cl +$ $+ Ar = Cl'_2 + Ar$	293	14.37	-	-	-	dis.	[812]	1641
$Cl'(3^2P_{1/2}) + Cl +$ $+ Cl_2 = Cl'_2 + Cl_2$	293	14.97	-	-	-	dis.	[812]	1641
$Br'(^2P_{1/2}) + Br =$ $= Br_2 + h\nu$	1300-2300	-	-	-	-	shock	[1214]	
$Br'(4^2P_{1/2}) + IBr =$ $= Br_2 + I$	300	~12.26	-	-	-	pulse photol.	[482]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$I'(5^2P_{1/2}) + Cl_2 =$ $= ICl + Cl$	~ 300	11.10	-	-	-	pulse photol.	[479]	
$I'(5^2P_{1/2}) + Br_2 =$ $= IBr + Br$	~ 300	11.95	-	-	-	pulse photol.	[479]	
$I'(5^2P_{1/2}) + ICl =$ $= I_2 + Cl$	~ 300	12.31	-	-	-	pulse photol.	[479]	
$I'(5^2P_{1/2}) + IBr =$ $= I_2 + Br$	~ 300	12.41	-	-	-	pulse photol.	[479]	
$I'(5^2P_{1/2}) + C_3H_8 =$ $= HI + C_3H_7$	300-363	-	10.25	0	5.0±0.3	photol. I_2	[294, 295]	1642
$I'(5^2P_{1/2}) + C_2H_6 =$ $= HI + C_2H_5$	333-363	-	10.42	0	7.0±0.8	photol. I_2	[295]	
$I'(5^2P_{1/2}) + CH_3I =$ $= I_2 + CH_3$	~ 300	12.01	-	-	-	pulse photol. CH_3I	[478]	1648
	"	≤ 12.01	-	-	-	photol. CF_3I	[480]	
	350-730	-	11.25±0.5	0	1.9±0.5	pulse photol. CH_3I	[1114]	
$I'(5^2P_{1/2}) + C_2H_5I =$ $= I_2 + C_2H_5$	~ 300	≤ 11.06 ± ± 0.05	-	-	-	photol. CF_3I	[480]	
$I'(5^2P_{1/2})$ + n-$C_3H_7I =$ $= I_2 + C_3H_7$	~ 300	≤ 11.08 ± ± 0.04	-	-	-	photol. CF_3I	[480]	
$I'(5^2P_{1/2})$ + iso-$C_3H_7I =$ $= I_2 + C_3H_7$	~ 300	≤ 11.08 ± ± 0.04	-	-	-	photol. CF_3I	[480]	
$I'(5^2P_{1/2})$ + n-$C_4H_9I =$ $= I_2 + C_4H_9$	~ 300	≤ 11.24 ± ± 0.08	-	-	-	photol. CF_3I	[480]	
$I'(5^2P_{1/2})$ + iso-$C_4H_9I =$ $= I_2 + C_4H_9$	~ 300	≤ 11.24 ± ± 0.08	-	-	-	photol. CF_3I	[480]	

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$I'(5^2P_{1/2})$ + + tert-$C_4H_9I = I_2$ + + C_4H_9	~300	≤ 11.33 ± ±0.16	–	–	–	photol. CF_3I	[480]	
$Hg'(^3P) + C_2F_4 = Hg$ + + $2CF_2$	296	–	–	–	–	photo-ex.	[1357]	1644
$NO'(A^2\Sigma^+) + H_2 = NO$ + + $H + H$	296	–	–	–	–	photo-ex.	[741]	1645
$NO'(A^2\Sigma) + NO = N_2$ + + O_2	room	13.23	–	–	–	photol.	[1074]	
$NO'(A^2\Sigma) + CO_2 = NO$ + + CO_2 and $NO_2 + CO$	296–578	–	–	–	–	–	[400]	1646
$NO'(A^2\Sigma^+) + CH_4 = NO$+ + $CH_3 + H$	296	–	–	–	–	photo-ex.	[741]	1647
$NO'(A^2\Sigma^+) + C_2H_6$ = = $NO + C_2H_5 + H$	296 and 468	–	–	–	–	photo-ex.	[741]	1648
$NO'_2 + NO_2 = NO_3 + NO$	2000	–	~11.95_4	1/2	0	shock	[997, 998]	
$O'_2(^1\Delta g) + H = OH + O$	600–800	≥10.78	–	–	–	fl.	[1709]	
$O'_2(^1\Delta g) + O_3 = 2O_2$ + + O	room	≤ 11	–	–	–	dis., flow	[1047]	
	"	9.17±0.09	–	–	–	dis.	[1083]	
$O'_2(^1\Sigma^+g) + O_3$ = = $2O_2 + O$	room?	11.56	–	–	–	dis., flow	[1047]	
	"	12.62_5± ±0.05	–	–	–	photol.	[821]	
$O'_2 + O_3 = O_2 + O_2 + O$	room	–	–	–	–	dis., O_2	[1062]	1649
$CH'_2 + CO \rightarrow CH_2CO$	room?	–	–	–	–	photol.	[447]	1650
$CH'_2 + C_2H_4 \rightarrow C_3H_6$	297	–	–	–	–	Hg photo.	[967]	1651

Reaction	T°K	lg k	lg A	n	E	Method	Literature	Remarks
$CH'_2 + C_3H_6 \rightarrow C_4H_8$	297	-	-	-	-	Hg photo.	[967]	1652
$CH'_2 + C_2H_5CHCH_2 \rightarrow$ $\rightarrow C_5H_{10}$	297	-	-	-	-	Hg photo.	[967]	1653
$CH'_2 +$ iso-$C_4H_8 \rightarrow$ $\rightarrow C_5H_{10}$	297	-	-	-	-	Hg photo.	[967]	1654
$CH'_2 +$ c-$C_4H_8 \rightarrow$ $\rightarrow C_5H_{10}$	297	-	-	-	-	Hg photo.	[967]	1655, 1654
$CH'_2 +$ trans-$C_4H_8 \rightarrow$ $\rightarrow C_5H_{10}$	297	-	-	-	-	Hg photo.	[967]	1656, 1654
$CH'_2 + (CH_3)_2CCHCH_3 \rightarrow$ $\rightarrow C_6H_{12}$	297	-	-	-	-	Hg photo.	[967]	1657
$CH'_2 + (CH_3)_2CC(CH_3)_2 \rightarrow$ $\rightarrow C_7H_{14}$	297	-	-	-	-	Hg photo.	[967]	1658
$CH'_2 + CH_2CHCHCH_2 \rightarrow$ $\rightarrow C_5H_8$	297	-	-	-	-	Hg photo.	[967]	1659
$CH'_2 +$ cyclo-$C_4H_6 \rightarrow$ $\rightarrow C_5H_8$	room	-	-	-	-	photol. CH_2N_2	[508]	1660
$CH'_2 + CH_3CH_2Cl =$ $= CH_2Cl + C_2H_5$	room	-	-	-	-	photol. CH_2CO	[100]	1661
$CF'_2 + CF_2O_2 = 2CF_2O$	302-400	-	-	-	-	Hg photo.	[746]	1662

1. The two values of k for each temperature were obtained under two extreme assumptions as to the residence time of H atoms in the reactor.

2. The rate constants of the reactions $H + H_2 = H_2 + H$, $H + para\text{-}H_2 = ortho\text{-}H_2 + H$ and $H + ortho\text{-}H_2 = para\text{-}H_2 + H$ are in the ratio of $1:\frac{3}{4}:\frac{1}{4}$. For theoretical calculations of the k of the given reaction see [777, 877, 1394]. See also [1381, 1394a, 1457a].

3. The Γ factor characterizing the probability of a tunnel transition is

$$\Gamma = \frac{\frac{E_c}{RT}\left(1 - \frac{2\pi RT}{h\nu^*}\right)}{1 - \frac{2\pi RT}{h\nu^*}} \qquad \text{when} \qquad \frac{2\pi RT}{h\nu^*} < 1$$

and

$$\Gamma = \frac{h\nu^*}{2RT} \csc \frac{h\nu^*}{2RT} \qquad \text{when} \qquad \frac{2\pi RT}{h\nu^*} > 1 ,$$

where E_c is the height of the potential barrier and ν^* is the imaginary frequency of asymmetric linear oscillation of the transition complex [134].

For the given reaction $\nu^* = 1{,}178,\ 2i\ cm^{-1}$.

The value of k calculated by this formula at 1,000°K is $10^{11.69}$ [995]. This formula must probably be considered as the most exact one. See also [1394a].

4. Obtained using the data of [516].

5. The authors of [186, 187] have shown that elimination of air diffusion through the walls reduces the exchange rate of $H_2 + D_2 = 2HD$ by a factor of two. They therefore consider the data of [519, 1540] to be too high (by a factor of about two).

6. Table XII 5. The formula is given with reference to [187, 519, 613, 1540]. In [1712] (p. 254) it is shown that according to the transition state theory the E in the Arrhenius formula should increase with increasing T.

7. The formula was obtained on the basis of [519, 613, 1104, 1540].

8. Obtained on the basis of [519, 613, 1540], the values of k obtained in [519, 1540] being reduced by one-half [187].

9. If the values of k obtained in [995, 1318] for the reaction $H + H_2 = H_2 + H$ are assumed to be closest to reality and if the mean theoretical k ratio 0.40 [1394] is used, we will have $10^{11.28}$ for 1,000°, i.e., a value which is half that measured in [187].

10. For theoretical calculations of the k of this reaction see [187, 777, 1394, 1592]; see also [1394a, 1457a].

11. Using the theoretical relation for the constants [1394] and the result of [995] for 1,000°, we get $10^{11.18}$.

12. This formula should probably be considered the most exact. See also [995]. According to [995] it can be extrapolated to 1,000°.

13. See also [1581].

14. For calculations of the k of this reaction see [187, 526, 777, 995, 1394]. See also [1394a, 1457a].

15. The reaction of hot H atoms is examined in [333].

16. Calculated by the least-squares method (LSM) on the basis of [187, 1380, 1585] and on the basis of the value of k at 1,000° calculated from the k of the reaction $H + H_2 = H_2 + H$ and from the theoretical k ratio in these reactions. It is not ruled out that the formula in [1380], extended to a temperature range of up to 1,000°, is more accurate.

17. In the opinion of Kaufman and Del Greco [895], the rate constant of this process apparently cannot be represented by an Arrhenius formula with constant pre-exponential factor for a broad temperature range (hence the two formulas given by them). The inaccuracy of the given formula is pointed out in [1491].

18. The author of [973] also obtained theoretical expressions for the k of the reactions $H + O_2 = OH + O$ and $D + O_2 = OD + O$, from which the complex temperature dependence of the pre-exponential factor follows.

19. The accuracy of the pre-exponential factor is 30-40%; the accuracy of E is 0.8-1.0.

20. Obtained using the data of [78, 450, 533, 1700, 1735] and K.

21. Accuracy is ± 20%.

22. In connection with the low value of E, the authors point to [973], where it was shown by calculation that E should equal 16.7 at 300° and 14.0 at 2,000°.

23. This value was obtained using the inaccurate formulas for the k of the reactions $H_2 + O_2 = 2OH$ and $OH + H_2 = H_2O + H$ given in [488].

24. Obtained on the basis of the data of [87, 372, 533, 534, 537, 895, 1378]. See also [93].

25. Based on the data of [87, 371, 533, 895, 1378]. The authors also cite formulas such as $k = \sqrt{T}\exp\left(-\frac{E}{RT}\right)$ and $k = AT\exp\left(-\frac{E}{RT}\right)$.

26. Obtained from the data of [87, 394, 534, 895, 1378, 1440, 1735].

27. Calculated by the least-squares method on the basis of [78, 469, 533, 700, 895, 973, 1378, 1700, 1707, 1735, 1756, 1757].

28. See also [248].

29. A value of $k = 6 \times 10^{12}$ for 300° is listed, with reference to [607] and [728].

30. Given is the mean value of the constant. The electron excitation energy of OH is $^2\Sigma^+ - {}^2\Pi = 88.3$.

31. Calculated on the basis of the rate constant of the inverse reaction [537] and of the equilibrium constant. See also [824].

32. Obtained taking the data of [78, 387, 537, 1700] into account. See also [1707].

33. Calculated from the recommended k_- and K. The latter was taken from [895].

34. Obtained considering [450, 537, 1639].

35. Obtained on the basis of the data of a number of authors.

36. E = 21.8 was chosen arbitrarily.

37. From the temperature coefficient the authors find E = 6.0. See also [710].

38. Calculated from the relation for the constant k of the reaction $2HO_2 = H_2O_2 + O_2$ at 293°, assuming it is independent of the temperature, and from the relation for the k of the reaction $H + O_2 = OH + O$; $k = 10^{14.31} \exp\left(-\frac{16{,}500}{RT}\right)$. A value one-and-one-half smaller is obtained using the recommended formula.

39. Obtained on the basis of [91] and [565] with the recommended k of the reaction $H + O_2 = OH + O$.

40. The rate constants of the reactions $H + HO_2 = H_2 + O_2$, $H + HO_2 = H_2O + O$ and $H + HO_2 = 2OH$ are in the ratio 1.0:1.2:0.1 [1726]. According to [395], the k of the first of these reactions amounts to 0.33 ± 0.12 of the sum of the rate constants of all three reactions (at room temperature), and the k of the last reaction is greater than one-half the k of the second reaction.

41. This formula, obtained on the basis of a number of assumptions, is rather in the nature of an estimate.

42. The large pre-exponential factor in this formula, greater by two orders than the gas-kinetic-theory-collision factor, makes it somewhat improbable. Also improbable for the same reason is the formula $k = 10^{16.25} \exp\left(-\frac{17{,}600}{RT}\right)$, which is obtained on the basis of the formulas in [91] and [1408]. The formula in [91] is probably closest to reality.

43. Given for the ratio of the k of this reaction and of the reaction $H + H_2O_2 = H_2 + HO_2$ at 440°C is 8.1 ± 2.

44. The ratio of the k of this reaction to the k of the reaction $H + C_2H_4 \rightarrow C_2H_5$ is 2.1 ± 0.1.

45. Calculated by the least-squares method on the basis of [141, 570, 573, 575, 941, 1241, 1416, 1464].

46. According to [437], the data in [436] may be erroneous because of the influence of the hot hydrogen atoms.

47. The expression was obtained on the basis of $k_- = 10^{11.59} \exp\left(-\frac{810}{RT}\right)$ (page 209) and of the equilibrium constant $K = k_-/k = 10^{-2.48} \exp\left(\frac{24,370}{RT}\right)$ calculated from [1765].

48. The ratio of the k of the reaction $H + C_2H_4 \rightarrow C_2H_5$ to the k of this reaction is $10^{1.41} \exp\left(\frac{540 \pm 120}{RT}\right)$.

49. Calculated from $k_- = 10^{11.82} \exp\left(-\frac{9,390}{RT}\right)$ (page 188) and from the equilibrium constant $K = k/k_1 = 10^{1.20} \exp\left(\frac{1,560}{RT}\right)$, [1765].

50. The rate constant was obtained from the k ratio calculated in [1731] for the reactions $O + O_3 = 2O_2$ and $O + O_2 + O_2 = O_3 + O_2$. The latter was taken as $k_{O+O_2+O_2} = 10^{13.92\pm0.21} \exp\left(\frac{700 \pm 200}{RT}\right)$.

51. The constant k_- was calculated from data obtained by various authors (see note 366) and is given on page 65. K was taken from [895].

52. $10^{1.3\pm0.1} \exp\left(-\frac{1,840 \pm 100}{RT}\right)$ has been obtained for the ratio of k of the reactions of H with HCl and with Cl_2.

53. Calculated on the basis of

$$\frac{k_{H+HCl}}{k_{H+Cl_2}} = (0.143 \pm 0.033) \exp\left(-\frac{1,540 \pm 130}{RT}\right)$$

[944] and of the formula

$$k_{H+HCl} = (3.5 \pm 1.5)\ 10^{11}\sqrt{T} \exp\left(-\frac{2,900 \pm 300}{RT}\right)$$

[379]. See also [831].

54. The formula $(0.143 \pm 0.033) \exp\left(-\frac{1,540 \pm 130}{RT}\right)$, ($T = 273\text{-}335°$) is given in [944] for the ratio of k of the reactions $H + HCl = H_2 + Cl$ and $H + Cl_2 = HCl + Cl$.

55. With reference to [1613] and [944], $10^{0.7} \exp\left(\frac{1,800}{RT}\right)$ is given for the ratio of the k of this reaction to that of the reaction $H + HCl = H_2 + Cl$.

56. The ratio of the k of this reaction to the k of the reaction $H + HCl = H_2 + Cl$ is 20.

57. Calculated from the difference in E found in [768] and [1213] for the reactions $H + Cl_2 = HCl + Cl$ (1) and $H + O_2 \rightarrow HO_2$ (2); $E_1 - E_2 = 2.3 \pm 0.4$ (mean value) and $E_2 = -1.28 \pm 0.09$ [621]. See also [204].

58. Calculated on the basis of the ratio of k of the given reaction and the reaction $H + HCl = H_2 + Cl$, as measured in [438] and [944], and of the formula recommended in the latter for k.

59. E = 1.0 was obtained on the basis of the fact that the E of the reaction $H + HBr = H_2 + Br$ is about 1.0 and the ratio of the k of this reaction and of the reaction $H + Br_2 = HBr + Br$ (= 0.12) is, according to [196], independent of the temperature in the temperature range 0-300°C.

60. The ratio of k of the reactions $H + Br_2 = HBr + Br$ and $H + HBr = H_2 + Br$ is 8.4.

61. The formula was obtained using the ratio of $k_4 = 8.4k_3$, $H + Br_2 = HBr + Br$ (4), $H + HBr = H_2 + Br$ (3), measured in the temperature range of 303-575°, and of the k of the reaction $Br + H_2 = HBr + H$ [196]. We note that $5 < \frac{k_4}{k_5}$ when $T \simeq 1{,}400°$ [235]. See also [1491].

62. The k ratio of the reactions $H + Br_2 = HBr + Br$ and $H + HBr = H_2 + Br$ is $10^{0.94 \pm 0.24}$.

63. Obtained from the k of the reaction $H + HI = H_2 + I$ [1449] and from the ratio

$$\frac{k_{H+I_2}}{k_{H+HI}} = 3.5 \pm 0.3$$

[1511]. From the (apparently) more exact ratio

$$\frac{k_{H+I_2}}{k_{H+HI}} = 16.7$$

[799] follows $k = 10^{13.27}\sqrt{T}$.

64. The value $4 \times 10^{-2} \exp\left(\frac{4{,}500 \pm 800}{RT}\right)$ was obtained for the k ratio of this reaction and of the reaction $H + HI = H_2 + I$ with a large excess of argon, in the absence of hot hydrogen atoms stemming from the process $HI + h\nu = H + I$. This ratio must be considered inaccurate, since it yields $E \geq 4.5 \pm 0.8$ for

the E of the reaction $H + HI = H_2 + I$, which contradicts the data of all other work.

65. See also [1190].

66. The k ratio of the reactions $H + HI = H_2 + I$ (4) and $H + I_2 = HI + I$ (5) is 0.075 ± 0.009 at 667° and 0.083 ± 0.007 at 800°. The possibility of considerable inaccuracy in the calculation of $\frac{k_4}{k_5}$ in [1449] is pointed out in [799].

67. See also [1287, 1491].

68. The k ratio of this reaction to the reaction $H + HI = H_2 + I$ is $4.95 \exp\left(\frac{640}{RT}\right)$.

69. The k ratio of this reaction to the reaction $H + HI = H_2 + I$ is 12 ± 1, the difference $E = 0 \pm 0.25$.

70. The data of [1436], recalculated on the basis of a more exact value for the equilibrium constant $H_2 \rightleftharpoons 2H$, are given in [554].

71. Obtained from the data of [43, 379, 1316]. See also [547].

72. Calculated by the least-squares method on the basis of [379, 554, 1436].

73. Obtained from the k of the reaction $Br + H_2 = HBr + H$ [196] and from K.

74. From the data of [198] near 500° we obtain $E = 0.5 \pm 0.5$.

75. Given with reference to [81] and [305].

76. On the basis of the data of [659], the value 0.06 was obtained for the k ratio of the reactions $H + HI = H_2 + I$ and $H + I_2 = HI + I$. The rate constant of the first reaction was calculated from k_- and K.

77. The authors also do not exclude the reaction $H + Cl_2O = HCl + ClO$.

78. Given as the recommended formula in [1289] and [1290], with reference to [474].

79. The expression $3 \exp\left(-\frac{7,800}{RT}\right)$ was obtained for the k ratio of the reactions $H + CO_2 = OH + CO$ and $H + H_2O = H_2 + OH$.

80. Obtained from $k_- = 5.6 \times 10^{11} \exp\left(-\frac{1,080}{RT}\right)$ and from K.

81. Obtained from the measured k ratio of this reaction to the reaction $H + D_2O = HD + DO$ and from the k of the latter.

82. Calculated on the basis of the data of [1505] and of the equilibrium constant $H_2 \rightleftharpoons 2H$ [1765]. See also [164].

83. According to [1289], E = 33.0. In [594], with reference to [1589] and [1691], is given the formula $k = 1.3 \times 10^{15} \exp\left(-\frac{33{,}000}{RT}\right)$. In [1289], with reference to Kaskan and Browne, the formula $k = 2.7 \times 10^{17} T^{-0.79} \exp\left(-\frac{30{,}700}{RT}\right)$ was given. See also other formulas in [1289].

84. This formula was used in [497] in the temperature interval 750-1,000°.

85. The authors do not exclude the reaction of H_2 with N_2H_3.

86. Obtained using the data of [533] and [1364].

87. Obtained on the basis of [469, 533, 1364].

88. For other formulas and the values obtained for k by a number of authors, see [1288].

89. Obtained on the basis of the measured k ratio of the reactions $H + NO_2 = OH + NO$ and $H + Cl_2 = HCl + Cl$, $0.16 \exp\left(\frac{3{,}130}{RT}\right)$, and of the recommended k for the latter reaction.

90. Obtained on the basis of the measured (in [49]) k ratio of the reactions $H + O_2 + H_2 = HO_2 + H_2$ and $H + NO_2 = OH + NO$, equal to $1.01 \times 10^2 \pm 10\%$ (T = 633°), and of the recommended k for the first reaction.

91. Calculated on the basis of [49, 1243, 1344] with the more accurate values of the constants given in [49, 1344] obtained using the recommended values.

92. The formula $k = 10^{13.17} \exp\left(-\frac{2{,}700}{RT}\right)$ satisfies the data of [258, 386, 390].

93. See also [742, 1288]. The authors of [258] point out that k is essentially independent of the temperature.

94. Obtained from the k of the reaction $D + CH_4 = HD + CH_3$ (multiplied by 1.4)

using the known k of the reaction $D + H_2 = HD + H$.

95. The data of [163, 539, 845, 1276, 1695 and 1704] were used.

96. According to [473], this formula must be corrected to $k = 10^{13.48} \exp\left(-\frac{8,200}{RT}\right)$.

97. Obtained on the basis of [163, 473, 539, 845, 943, 1695, 1704 and 1746].

98. Obtained from the data of [93, 94, 539, 963, 966, 1015, 1036].

99. Obtained in [541] on the basis of old data given in [1424].

100. Calculated by the least-squares method on the basis of [473, 539, 845, 1695, 1696, 1702, 1704, 1746 and 1757].

101. In [1522], and also in [1423] and [1430], it is assumed that the reaction takes place according to the scheme $H + C_2H_6 = CH_4 + CH_3$.

102. The activation energy of the reaction of addition of a hydrogen atom to propylene is taken to be 2.2 [290].

103. The enthalpy of the reaction is taken to be $\Delta H_{298} = 6.2$.

104. The formula $k_2 = 10^{12.408} \sqrt{T} \exp\left(-\frac{18,000}{RT}\right)$ for the k of the reaction $H + O_2 = OH + O$ was used in calculating the given k (from the measured k ratio). On the basis of the recommended formula we get $k = 10^{13.90} \exp\left(-\frac{9,030}{RT}\right)$ for the reaction with C_3H_8 and $k = 10^{14.01} \exp\left(-\frac{6,330}{RT}\right)$ for the reaction with iso-C_4H_{10}. For the reaction $H + C_2H_4 \rightarrow C_2H_5$ we get $k = 10^{13.67} \exp\left(-\frac{7,330}{RT}\right)$.

105. Estimate, taking the data for the paraffines into account.

106. The value 38 was obtained in [86] for the ratio of this constant to the k of the reaction $H + O_2 = OH + O$ at 813° (see [80]); a value of 40 was obtained in [1718] at 753°.

107. The formula was obtained on the basis of [1423, 1430, 1522].

108. Obtained using the data of [162, 436, 541].

109. Obtained on the basis of the data of [93, 161, 162, 436, 541].

110. Obtained on the basis of the data of [93, 436, 541].

111. Calculated by the least-squares method on the basis of [93, 331, 541, 1423, 1430, 1522, 1697, 1698]. See also [1695, 1704].

112. The difference in E of the reactions $H + C_3H_8 = H_2 + C_3H_7$ and $H + C_3H_6 \rightarrow C_3H_7$ is 4.

113. The k of the reaction $H + O_2 = OH + O$ [93a] was used. Using the recommended constant, we get 11.46 instead of 11.66.

114. Obtained on the basis of [83, 436, 905].

115. Calculated by the least-squares method on the basis of [83, 905, 906, 1644, 1646, 1698, 1757, 1766, 1767]. The values measured at room temperature in [1367, 1428, 1518, 1522] were not considered. The formula $k = 10^{13.96 \pm 0.11} \times \exp\left(-\frac{7{,}950 \pm 200}{RT}\right)$ is obtained in the temperature interval 333-512° on the basis of [905, 906, 1644, 1646].

116. The value of k for the reaction $H + O_2 = OH + O$ (5.1×10^9) at 520°C was used [82]. The recommended figure yields 11.58 for reaction with n-C_4H_{10} and 11.83 for reaction with iso-C_4H_{10}.

117. Calculated from the measured k ratio of this reaction and the reaction $H + C_3H_8 = H_2 + C_3H_7$ $0.5 \exp\left(\frac{1{,}070}{RT}\right)$ and the k of the latter; $k = 10^{14.12} \times \exp\left(-\frac{8{,}200}{RT}\right)$. Using the recommended formula for the k of this reaction we get $k = 10^{12.71} \exp\left(-\frac{5{,}150}{RT}\right)$.

118. The data of [436] were used, assuming that the k of the reactions $D + RH = DH + R$ and $H + RH = H_2 + R$ are identical.

119. Calculated by the least-squares method on the basis of [98, 906, 1646, 1698] using the recommended values for the constants.

120. Calculated by the least-squares method on the basis of [98, 1646].

121. Obtained using the k of the reaction of H with trimethylethylene [15].

122. Obtained assuming that the rate constant of the reaction $H + H_2 = H_2 + H$ is $10^{8.1}$, according to [613]. This figure practically coincides with that measured in [1318], which must be considered more accurate.

123. The use of the recommended k of the reaction $H + O_2 = OH + O$ yields 11.22 (instead of 11.40).

124. The authors of [1511] state that the constant they measured may be valid for the reaction $H + C_2H_2 \rightarrow C_2H_3$.

125. The ratio of the k of this reaction to that of the reaction $H + C_2H_4 \rightarrow C_2H_5$ is 1.7 ± 0.2.

126. Obtained from the measured ratio of the k of this reaction to the k of the reaction $H + C_2H_4 \rightarrow C_2H_5$ [2], and $E_2 = 4.1$ [828].

127. The ratio of the k of this reaction to the k of the reaction $H + C_2H_4 \rightarrow C_2H_5$ is 1.15 ± 0.10. This figure was obtained for dilution with carbon dioxide, which leads to thermalization of the hydrogen atoms. In [1432] the authors obtained 2.32 ± 0.11 (without dilution).

128. The k ratio of this reaction and the reaction $H + C_2H_4 \rightarrow C_2H_5$ is 1.9 ± 0.1.

129. The k ratio of this reaction and the reaction $H + C_2H_4 \rightarrow C_2H_5$ is 1.05 ± 0.05. This figure was obtained for CO_2 dilution, which leads to thermalization of the H atoms. The figure 2.00 ± 0.05 was obtained without dilution.

130. The ratio of the k of this reaction to the k of the reaction $H + C_2H_4 \rightarrow C_2H_5$ is 3.2 ± 0.1.

131. The ratio of the k of this reaction to the k of the reaction $H + C_2H_4 \rightarrow C_2H_5$ is 3.7 ± 0.1.

132. The ratio of the k of this reaction to the sum of the k of the reactions $O + HCO = OH + CO$ and $O + HCO = CO_2 + H$ is 3 ± 2.

133. Measured in [300] was the ratio of the k of this reaction to the k of the reaction $H + C_3D_8 = HD + C_3D_7$.

134. The formula was obtained on the basis of the k of the reaction $D + H_2 = HD + H$, $k = 1.2 \times 10^{12} \sqrt{T} \exp\left(-\frac{5,400}{RT}\right)$ [943], taking [187] into account. On the basis of the recommended formula for the k of the latter reaction we get the formula $k = 10^{13.92} \exp\left(-\frac{4,330}{RT}\right)$ for the k of the reaction $H + HCHO = H_2 + HCO$ and the formula $k = 10^{13.22} \exp\left(-\frac{5,330}{RT}\right)$ for $H + DCDO = HD + DCO$.

135. Calculated using the k of the reaction $D + H_2 = HD + H$, $k = 3 \times 10^{13} \times \exp\left(-\frac{6,700}{RT}\right)$ [1394, 1491]. On the basis of the recommended formula we get $k = 10^{13.92} \exp\left(-\frac{4,030}{RT}\right)$.

136. Obtained on the basis of the measured values $E_B - E = 1,010 \pm 80$, $\frac{A}{A_B} = 1.13 \pm 0.09$ ($H + D_2CO = HD + CDO$, B) [1094] and $E_A = E_B$, $A_A = A_B$ [166, 1529].

137. Obtained assuming $\frac{k}{k_A} = \frac{k_B}{k_C}$, where k, k_A, k_B, and k_C are the rate constants of the reactions $H + HCHO = H_2 + CHO$, $D + DCDO = D_2 + CDO$ (A), $H + H_2 = H_2 + H$ (B) and $D + D_2 = D_2 + D$ (C), on the basis of the data of [187, 943, 1094, 1394].

138. Obtained assuming $\frac{k}{k_A} = 1.4$ (see the preceding remark) on the basis of [187, 943, 1094, 1394].

139. Obtained on the basis of [87, 223], assuming equality between the k of the reactions $H + DCDO = HD + DCO$ and $D + DCDO = D_2 + DCO$, taking into account the recommended k of the reaction $D + H_2 = HD + H$.

140. See remark 134. Using the recommended formula for $D + H_2 = HD + H$ we get $k = 10^{13.22} \exp\left(-\frac{5,330}{RT}\right)$.

141. The authors of [979] assert that the interaction of H with CH_3CHO is represented not by the reaction $H + CH_3CHO = H_2 + CH_3CO$, but by $H + CH_3CHO = CH_4 + HCO$ [1077].

142. Calculated on the basis of [722, 1757].

143. Obtained assuming that the k of the reaction $CH_3 + O_2 \rightarrow$ inactive products is considerably greater than the k of the reaction $CH_3 + O_2 = OH + HCHO$.

144. Calculated by the least-squares method on the basis of [24, 1409].

145. The k ratio of the two reactions is 0.09.

146. The k ratio of the two reactions is 3.3.

147. $\Delta = 0.24$.

148. The k ratio of the two reactions is 0.33.

149. The k ratio of the two reactions is 1.6.

150. The k ratio of the two reactions is 3.4.

151. The k ratio of the two reactions is 0.55.

152. The k ratio of the two reactions is 0.21.

153. The k ratio of the two reactions is 0.38.

154. The k ratio of the two reactions is 1.5.

155. Obtained from the measured ratio of the k of this reaction to the k of the reaction $H + HI = H_2 + I$, $k = 10^{12.04}$.

156. The steric factor is taken as 0.1.

157. The authors note the particular purity of the H_2.

158. Given in [1491], with reference to [1413], is $\log k > 17.6$.

159. $n = -1$ was chosen arbitrarily.

160. The accuracy is estimated as ±50%.

161. Obtained taking [1322, 1374] into account.

162. Calculated from graph 6 in [1459].

163. The constant k_p for $M = Ar$ in the temperature range 300-2,000° was calculated in [140, 148] under various assumptions as to the parameters determining the

interaction of the colliding particles.

164. The accuracy is estimated as ±30%. According to the data of the author, the effectiveness of Kr and Xe is equal to the effectiveness of Ar.

165. Calculated by the least-squares method on the basis of [829, 981, 983, 1220, 1322, 1459].

166. Calculated from the data of [18] with allowance for diffusion and convection in the flux.

167. The authors of [983] believe that the somewhat lower value they obtained for the constant k_p, compared to the data of prior papers, must be explained by the presence of water in the hydrogen in these papers. They assume that the temperature-dependence of k_p (M = Ar) in a broad temperature range is closest to $k_p \sim T^{-1}$, even though it is close to the room temperature $k_p \sim T^{-0.6\pm0.2}$.

168. The measurement error is estimated by the author to be 20%.

169. Obtained under the assumption that the efficiencies of N_2 and H_2O are the same.

170. The figure given in [1339] is divided by two in conformity with the chosen determination of the constant k_p.

171. Calculated by the least-squares method on the basis of [18, 20, 468, 469, 525, 809, 829, 965, 1055, 1322, 1413, 1437, 1459, 1627, 1673].

172. It is assumed that the efficiencies of N_2 and H_2O are the same in the reactions $H + H + M = H_2 + M$ and $H + OH + M = H_2O + M$ [468].

173. This figure was obtained on the basis of the incorrect assumption that only H_2O molecules are effective as particles M.

174. The authors of [1491] point out that the data of [983] should be more exact, since in the preceding articles the effect of the presence of water in the hydrogen was disregarded. Given in [1491] is $k < 10^{16.48}$.

175. Obtained with allowance for [257, 1072].

176. The efficiencies of CO and CO_2 are taken to be the same.

177. Here M refers to gases in the flame.

178. It is assumed that all the gases in the flame are equally efficient [468].

179. These values of k were taken from calculations of the detonation front in the mixture $2H_2 + O + Xe$. See also [1287].

180. Obtained on the basis of [257, 468, 878, 1313].

181. The authors of [1196] assume that the reaction we studied is $H + OH + M = H_2O + M$, but they note that their method does not permit distinguishing this reaction from the reaction $OH + OH + M = H_2O_2 + M$.

182. In the range 1,400-2,000° the authors of [1376] did not detect a temperature dependence of the ratio of the rate constants of the reactions $H + H + Ar = H_2 + Ar$ and $H + OH + Ar = H_2O + Ar$.

183. Obtained from [468, 1072, 1339].

184. This figure was obtained under the assumption that the efficiency of H_2O is somewhat greater than that of H_2, O_2 and N_2. Since it was shown at a later date [468] that the efficiencies of all these gases are probably quite close to each other, the real value of the recombination constant of $H + OH + H_2O = H_2O + H_2O$ at 1,650° should be less than that given in the table.

185. M is a mixture of CO and H_2.

186. Given without reference.

187. See also [386]. The relative efficiencies of $He:Ne:Ar:H_2$ are 1.0:1.1:1.3:2.2.

188. H-atom diffusion was taken into account.

189. ±30%.

190. Obtained using the data of [395, 620, 699].

191. Obtained using the data of [79, 395, 621].

192. Obtained using the constant measured from the location of the upper ignition limit of the mixture H_2-O_2.

193. Calculated by the least-squares method on the basis of [371, 395, 621, 982].

194. See also [247].

195. According to the measurements of a number of authors, the relative values of the efficiency of various gases (M) at 800° are expressed by the following figures:

H_2	O_2	N_2	He	Ar	CO_2	H_2O	CF_4	SF_6	References
1	1	-	-	-	2	10	-	-	[1614]
1	0.33	0.55	0.41	-	1.39	6.6	-	-	[49](633°)
1	0.35	0.43	-	-	1.47	5	-	-	[1745]
1	0.37	0.43	-	0.18	1.53	-	2.29	2.65	[1019]
1	0.35	0.43	0.36	0.20	1.47	14.3	-	-	[1006,1491]
1	-	-	-	-	-	6.4	-	-	[85]

See also [1354]. Also given in [1019] are the relative efficiencies of various gases for the reaction $D + O_2 + M = DO_2 + M$. In the cited paper the question of the efficiency of various molecules is discussed from the viewpoint of collision theory and of energy exchange (see also [455, 1563]).

196. Obtained under the assumption that the efficiency of H_2 is greater by a factor of five than that of argon. Recommended in [395] is the formula $k = 2 \times 10^{15} \exp\left(\frac{2,000}{RT}\right)$ or $5 \times 10^{21} T^{-2}$.

197. Obtained on the basis of the data of [264, 788].

198. Obtained under the assumption that $E_4 - \frac{1}{2} \times E_6 = 0$, where E_4 is the E of the reaction $H + HO_2 = 2OH$ and E_6 is the E of the reaction $2HO_2 = H_2O_2 + O_2$.

199. Warren [1573] found that the temperature coefficient of the second ignition limit of hydrogen corresponds to E = 20; hence, in view of the fact that the E of the reaction $H + O_2 = OH + O$ is 16-17, we get E = 3-4 for the reaction $H + O_2 + M = HO_2 + M$. See also [79].

200. The efficiency of O_2 amounts to 0.49 of the efficiency of H_2.

201. The authors of [787] consider the data of [99, 1221, 1328] to be compatible, assuming that the reaction has an E = -4.

202. Calculated by the least-squares method on the basis of [79, 395, 972]. In the last reference the efficiency of H_2 is taken to be five times greater than that of Ar. In reality, however, this difference is probably closer to 10 [1745], and the k of [395], multiplied by two, is taken for the calculation.

203. Obtained on the basis of [99, 1221, 1328] (see also [788]), assuming that the increase in the ratio

$$\frac{k_4^{O_2}}{k_4^{H_2}}$$

with increasing temperature, found by Warren [1573], is due to the difference in activation energy of $H + O_2 + M = HO_2 + M$ [4] with $M = O_2$ and H_2. We note that Warren himself interprets this fact differently.

204. According to [85], the efficiency of H_2O relative to that of H_2 in the range 733-813° is 6.4 ± 0.7; according to [95] it is 6.0; according to [1744], in the range 712-738°, it is 5.5; according to [1715], in the range 769-858°, it is 5.0; and according to [49], at 633°, it is 6.5 ± 1.6. According to [1614], H_2O is more efficient than H_2 in the reaction $H + O_2 + M = HO_2 + M$ by a factor of 14 at 793° and, according to [264, 265] by a factor of 60 at 319°.

205. Obtained from the ratio of the k of the reactions $H + SO_2 + H_2 = HSO_2 + H_2$ and $H + O_2 + H_2 = HO_2 + H_2$, equal to 2.0 ± 0.3, and from the k of the second reaction, as calculated from the data of [78, 92, 99, 787] (7.24×10^{15}). The recommended formula for the second reaction yields $10^{16.30 \pm 1.03}$.

206. The authors do not exclude the possiblity that the constant they measured is too high.

207. See [1593].

208. According to [875] the three principal components of the burned gas, N_2, H_2 and H_2O, are not greatly different in efficiency than M (within one order of magnitude). The two values were obtained by different methods.

209. Assuming that $M = H_2O$, the authors of [875] get $k \simeq 10^{17.6}$.

210. $p = 6.7$ mm Hg.

211. The data of [956, 1217] were used.

212. Obtained using the k recommended for the reaction $H + n\text{-}C_4H_{10} = H_2 + C_4H_9$.

213. The measurements were made at a total pressure of 2 mm Hg. This induces us to doubt the conclusion of the authors of [245] that the reaction is second-order and, consequently, to doubt the accuracy of measurement of k.

214. At room temperature (290-300°) the relative values of the k of H-atom addition to various molecules (assuming that the reaction is second-order) are expressed, according to the data of various authors, by the following figures [1491]:

C_2H_4	C_3H_6	C_4H_8-1	iso-C_4H_8	iso-C_4H_8-2	trans-C_4H_8-2	$(CH_3)_2CC(CH_3)_2$	$CH_2CHCHCH_2$	C_6H_6	Literature
1	0.32	-	0.76	1.06	0.83	0.98	-	-	[15,1105,1106]
1	1.6	-	-	-	-	-	-	-	[218]
1	1.79	1.94	4.41	0.84	1.05	1.45	8.67	-	[847]
1	1.3	-	13.3	0.94	0.52	2.05	23.5	0.1	[1644, 1645]

215. Calculated from the measured ratio of the k of the given reaction to the k of the reaction $H + C_3H_8 = H_2 + C_3H_7$. The formula $k = 10^{13.81} \exp\left(-\frac{7,830}{RT}\right)$ was chosen for the latter in [97].

216. Obtained from the measured ratio of the k of the given reaction to the k of the reaction $H + O_2 = OH + O$ (mean value -466) using the recommended k of the last reaction.

217. Obtained on the basis of the data of [97, 847, 1644].

218. Calculated by the least-squares method on the basis of [97, 220, 847, 1116, 1644].

219. Calculated by the least-squares method on the basis of [97, 220, 847, 1116, 1644, 1728].

220. Obtained from the measured ratio of the k of the reactions $H + C_2H_4 + H_2 = C_2H_5 + H_2$ and $H + O_2 + H_2 = HO_2 + H_2$ (3.12 ± 0.3) and from the k of the last reaction (2.0×10^{16}). The use of the recommended value yields log k = 17.39.

221. Used are the data of [97, 753, 1294], from which we get the formulas $k = 10^{8.97} \exp\left(-\frac{2,200}{RT}\right)$ for the reaction $C_2H_5^* = C_2H_4 + H$ and $k = 10^{13.47} \exp \times \left(-\frac{3,180}{RT}\right)$ for the reaction $H + C_2H_4 = C_2H_5^*$ [753]. It is assumed that deactivation of $C_2H_5^*$ takes place for each collision with H_2. The ratio of the efficiencies of H_2, O_2 and N_2 is 1:0.75:0.4.

222. From [436] we get $10^{0.90} \exp\left(-\frac{960}{RT}\right)$ for the ratio of the k of the reaction $H + H_2S = H_2 + SH$ to that of the given reaction. Hence, on the basis of the E of the first reaction, 2.7, [1562a], we get E = 1.74.

223. Disregarded in calculating the constant was its dependence on the pressure, which varied from 5 to 150 mm Hg.

224. The data of [290, 436] were used.

225. Pressure = 5 atm.

226. Obtained using the formula $k = 10^{13.01} \exp\left(-\frac{6,220}{RT}\right)$ for the k of the reaction $H + C_3H_8 = H_2 + C_3H_7$.

227. Obtained from relative measurements for the accepted value of the k of addition of H to trans-C_4H_8-2; $k = 6.3 \times 10^{11}$.

228. See also [436].

229. The difference between the E of the reactions $H + C_3H_6 \rightarrow CH_3CHCH_3$ (1) and $H + C_3H_6 \rightarrow CH_3CH_2CH_2$ (2) in the temperature interval 303-473° is $E_2 - E_1 = 2.4$ [1135]. It is therefore necessary to assume that iso-C_3H_7 forms predominantly at temperatures close to room temperature.

230. Calculated from the ratio of the k of the given reaction to the k of the reaction $H + C_3H_8 = H_2 + C_3H_7$, $k = 10^{12.2} \sqrt{T} \exp\left(-\frac{7,000}{RT}\right)$. Using the data of [290, 1400] the author of [1644] finds $k = 10^{12.8} \exp\left(-\frac{1,500}{RT}\right)$ for the reaction $H + C_3H_6 \rightarrow C_3H_7$; then, taking this formula as a standard, he gets $k = 10^{12.9} \exp\left(-\frac{1,900}{RT}\right)$ for $H + C_2H_4 \rightarrow C_2H_5$ and $k = 10^{13.0} \exp\left(-\frac{300}{RT}\right)$

for $H + C_3H_8 = H_2 + C_3H_7$.

231. Calculated from the measured ratio of the k of the given reaction to the k of the reaction $H + C_3H_8 = H_2 + C_3H_7$; $k = 10^{12.2} \sqrt{T} \exp\left(-\frac{7{,}000}{RT}\right)$ [1644].

232. The formula $k = 10^{13.01} \exp\left(-\frac{6{,}220}{RT}\right)$ was chosen for the k of the standard reaction $H + C_3H_8 = H_2 + C_3H_7$.

233. Taken as standard.

234. The accuracy is 15%.

235. The recommended formula for the k of H addition to trans-C_4H_8-2 was used.

236. The pressure is several mm Hg.

237. According to [805], the k measured in [464] must be increased by about 40%.

238. The hydrogen pressure is 1-15 mm Hg.

239. This figure is considered by the authors to be more exact than the one obtained earlier in [1106], owing to the better purification of the benzene in [15].

240. Obtained on the basis of a different interpretation of the data of [1192] under a number of assumptions.

241. E is the threshold of the reaction $D^* + H_2 = DH + H$, where D^* is a hot atom formed during photolysis of DX (X = I, Br).

242. $\nu^* = 1136.2i\ cm^{-1}$.

243. See also [1581].

244. Formula obtained on the basis of the data of [519, 613].

245. Calculated by the least-squares method on the basis of [187, 995, 1318, 1585].

246. The value calculated from the theoretical ratio of the constants [1394] and from the k of the reaction $H + H_2 = H_2 + H$, namely, $10^{11.69}$ [995], is $10^{11.30}$.

247. For calculations of the k of the given reaction see [187, 777, 1394].

248. The value calculated from the theoretical ratio of the constants [1394] and from the k of the reaction $H + H_2 = H_2 + H$, namely, $10^{11.69}$ [995], is $10^{11.17}$.

249. The data of [995] must obviously be considered as more accurate. We note that the value of k (at 1,000°) calculated by the given formula, namely, $k = 10^{11.42}$, agrees essentially with that obtained on the basis of the ratio of the constants [1394] and of the k of the reaction $H + H_2 = H_2 + H$, i.e., $10^{11.69}$ [995], namely, $10^{11.36}$.

250. The ratio of the rate constants of the reactions $D + D_2 = D_2 + D$, D + ortho-D_2 = para-$D_2 + D$ and D + para-D_2 = ortho-$D_2 + D$ is $1:\frac{1}{3}:\frac{2}{3}$. According to [187], the values obtained for k in [519] should be half as large. According to [519], the difference in E of the reactions $D + D_2 = D_2 + D$ and $H + H_2 = H_2 + H$ is 0.51.

251. Theoretical calculations of the k of the given reaction are presented in [777, 995, 1394].

252. According to [519], the rate of this reaction (2) at 873-923° is slower by a factor of 2.4 than the reaction $H + H_2 = H_2 + H$ (1); $E_2 - E_1 = 0.51$.

253. Calculated by the least-squares method on the basis of [973, 1698, 1722]. The formula agrees essentially with that calculated from the mean lg A and E.

254. Measured was the ratio of the k of the given reaction to the k of the reaction $D + I_2 = DI + I$ (0.073).

255. E = 6.2 was obtained from the temperature coefficient of the reaction rate. Assuming that the steric factor is 0.1, the authors of [616] obtain E = 11. They do not rule out the possibility that the reaction proceeds in part on the surface at room temperature.

256. E = 12 is given in [612] without reference to the authors.

257. Obtained on the basis of the measured ratio of the k of the reactions $D + H_2 = HD + H$ and $D + D_2S = D_2 + DS$ to the k of the first reaction; $k = 10^{13.41} \times \exp\left(-\frac{5,000}{RT}\right)$ [519].

258. Obtained using the recommended formula for $D + H_2 = HD + H$.

259. According to [1102], identical steric factors (0.33) correspond to the reactions of D with NH_3 and D with PH_3.

260. From the ratio of the rates of the given reaction to the reaction $H + D_2 = HD + D$, with the E of the latter equal to 6, we get 12.5.

261. E = 14-15 is given in [612] without reference to the authors.

262. The formula was obtained using the rate constant of the reaction $D + H_2 = HD + H$; $k = 1.2 \times 10^{12} \sqrt{T} \exp\left(-\frac{5,400}{RT}\right)$ [943].

263. Obtained using the recommended formula for the reaction $D + H_2 = HD + H$.

264. E was obtained under the assumption that the steric factor is 0.1.

265. Obtained with the k of the reaction $D + H_2 = DH + H$ equal to $10^{13.4} \exp \times \left(-\frac{5,000}{RT}\right)$, according to [519]. The use of the recommended formula yields $k = 10^{14.70} \exp\left(-\frac{11,730}{RT}\right)$. This formula, which was obtained on the basis of the formula given in the table must be considered as hardly probable in view of the large values of A and E.

266. The k ratio of the given reaction and of the reaction $D + iso\text{-}C_3H_7 \rightarrow C_3H_7D$ is ~ 0.2.

267. See remark 265. Using the recommended formula for $D + H_2 = HD + H$ we get $k = 10^{14.76} \exp\left(-\frac{9,930}{RT}\right)$. This expression is in good agreement with the results obtained in [1367]. In the case of reaction $D + n\text{-}C_4H_{10} = HD + C_4H_9$, use of the recommended expression also gives better agreement with [1367].

268. See remark 265. Using the recommended formula for $D + H_2 = HD + H$, we get $k = 10^{14.74} \exp\left(-\frac{9,830}{RT}\right)$.

269. See remark 265. Using the recommended formula for $D + H_2 = HD + H$, we get $k = 10^{14.74} \exp\left(-\frac{9,030}{RT}\right)$.

270. The discrepancy between the data of [1104] and [1367] is explained by the authors of [1367] as being due to the difference in the chosen reaction

mechanism. The results obtained in the two papers on the consumption of hydrogen atoms agree.

271. See remark 265. Using the recommended formula for $D + H_2 = HD + H$, we get $k = 10^{14.00} \exp\left(-\frac{7,730}{RT}\right)$.

272. See remark 265. Using the recommended formula for $D + H_2 = HD + H$, we get $k = 10^{14.44} \exp\left(-\frac{7,730}{RT}\right)$.

273. See remark 134. Using the recommended formula for $D + H_2 = HD + H$, we get $k = 10^{13.22} \exp\left(-\frac{4,430}{RT}\right)$.

274. The accuracy is estimated to be 30%.

275. According to graph 8 in [1459] the rate constant of the reaction $D + D + D = D_2 + D$ decreases approximately by a factor of 4 when the temperature increases from 3,000 to 4,500°.

276. The formula was calculated from graph 7 in [1459].

277. The efficiency of O_2 is 0.22 of the efficiency of D_2.

278. The relative values of the efficiencies of stabilization of DO_2^* (relative to O_2) are D_2:Ar:N_2:CO_2:CF_4:SF_6 = 1.95:0.52:1.55:3.82:2.59:6.28.

279. The rate constant is referred to the k of CH_3Cl, which is taken to be 5×10^{10}. The activation energy was calculated on the basis of the formula $k = 5 \times 10^{14} \exp\left(-\frac{E}{RT}\right)$.

280. The activation energy was calculated from the ratio of the effective number of collisions to the total number.

281. Calculated from the average number of collisions per conversion.

282. See also [733].

283. Given with reference to the unpublished study of Warhurst and Whittle.

284. Given with reference to the unpublished study of Quayle and Warhurst.

285. See also [717].

286. The pre-exponential factor is taken to be 5×10^{14}.

287. The pre-exponential factor and the activation energy were calculated on the basis of [596]. These data differ strongly from those obtained earlier and, in the opinion of the authors of [596], are more accurate.

288. The k ratio of the reactions Na + CNCl = NaCl + CN and Na + CNCl = NaCN + Cl, as defined from the yield of NaCl and NaCN, is 4 at 300°C and about 8 at 500°C.

289. Given with reference to the unpublished work of Walker and Warhurst.

290. Recalculation of the data of [514] with the introduction of a correction for the temperature dependence of the light absorption of Na.

291. The activation energy was calculated by the formula $k = 10^{14.7} \exp\left(-\frac{E}{RT}\right)$.

292. Given in [881] is the quantity k(M). The constant was calculated for p = 1 atm. M corresponds to a mixture of H_2, O_2, N_2 and H_2O.

293. The constant was measured for $p_{C_3H_8}$ = 6 mm Hg.

294. See also [883], p. 145.

295. See also [883], p. 146.

296. This number is given with a reference to an unpublished work. It is also indicated that the temperature at which the given constant was measured should be considerably higher than 300°.

297. See also [240, p. 22; 706, 894].

298. Given with reference to [1551].

299. Calculated by the least-squares method on the basis of the data of [384, 388, 389, 938, 1066, 1434, 1551, 1622].

300. The authors of [689] present arguments which insist on the greater accuracy

of their data compared to the previously obtained value of $k = 10^{9.08}$ at 293° [1305].

301. See remark 300. The previously obtained value is $10^{10.08}$ at 293° [1305].

302. Given in [689], with reference to [1240], are the values $10^{10.52}$ at 291° and $10^{10.56}$ at 328°, which differ from those calculated on the basis of the given formula by a factor of 2.5.

303. In the opinion of the authors of [1612], the reaction proceeds via the formation of an intermediate complex HClN, which then reacts with an N atom.

304. Calculated from the measured k ratio of the given reaction and the reaction $O + OH = O_2 + H$ (1.4 ± 0.1) and from the k of the latter reaction, as measured in [394].

305. See other formulas in [1288].

306. It is assumed that the reaction takes place in an ideally homogeneous reactor.

307. The k ratio of the reactions $N + O_2 = NO + O$ and $N + NO = N_2 + O$ is $10^{0.97} \exp\left(-\frac{18,600}{RT}\right)$.

308. The ratio of the k of the reaction $N + O_2 = NO + O$ to the k of the given reaction is about 0.07.

309. Given with reference to [631]; see also [1639].

310. Calculated on the basis of the data of [384, 388, 389, 758, 894, 1241, 1550].

311. The discrepancy between the data of [1546] and [1244] must be attributed, apparently, to the difference in the methods of determining the total constant.

312. The k ratio of the reactions $N + NO_2 = N_2O + O$ and $N + NO_2 = 2NO$ is 4.7 ± 1.2 and is independent of the temperature in the interval 300-700°. See also [727].

313. See also [1241].

314. The strong discrepancy between the data of [1244] and [726] (differing by about 2 orders) is undoubtedly due to method errors committed in one of the studies. The data of [1244] must apparently be considered as being closer to reality.

315. The over-all rate constant (of the reaction $N + NO_2 = 2NO$, $N_2O + O$, $N_2 + O_2$, $N_2 + 2O$) is $(1.1_1 \pm 0.1_3) \times 10^{13}$ [1244].

316. According to [310, 310a], the reaction of N atoms with CO_2 is of the second order in N and of the first order in CO_2, both at 196° and at 298°, and is, apparently, a reaction between $N_2'(A^3\Sigma_u^+)$ occurring during the recombination of N atoms and CO_2: $N_2' + CO_2 = N_2 + CO + O$.

317. The data of [1241], obtained for the kinetics of the reaction in its earlier stage, must be considered as more accurate.

318. The constants were calculated using the k of the reaction of N with propane (apparently, $N + C_3H_8 = NH + CH_3CHCH_3$), $k = 10^{12.72} \exp\left(-\frac{5{,}500}{RT}\right)$, assuming that only the N atoms are active particles. The authors of [867] state that in the low-temperature region the reaction apparently takes place by means of excited N molecules, but by means of N atoms in the high-temperature region. In the latter case they do not rule out the possibility of a chain-reaction mechanism.

319. According to [178], $N + C_2H_6 \rightarrow NC_2H_6 \rightarrow HCN + H_2 + CH_3$.

320. In the opinion of the authors of [1663], the reaction follows the scheme $N + C_2H_6 = HCN + CH_3 + H_2$.

321. In [676] k was measured in the temperature interval 273-377°. The Arrhenius plot, constructed by the least-squares method using points considered by the authors to be more reliable (in the interval 273-325°), corresponds to the formula $k = 10^{10.56\pm0.62} \exp\left(-\frac{290 \pm 840}{RT}\right)$.

322. It is shown in [760] that the reaction of N atoms with C_2H_4 cannot be represented by the simple mechanism

$$N + C_2H_4 = HCN + CH_3,$$
$$N + CH_3 = HCN + 2H,$$

a fact which is reflected in the dependence of the measured k on the quantity

$$\frac{(C_2H_4)_0}{(N)_0}.$$

The real k is obtained by extrapolating the measured k to

$$\frac{(C_2H_4)_0}{(N)_0} \to 0.$$

This is probably true of the reactions of N with all the olefins.

323. This number was obtained by the titration method using NO.

324. The rate constant was measured from the yield of HCN.

325. Given is the mean value of k while pointing out the small value of E. The author assumes that the primary formation is the complex C_2H_4N, which either reacts with the N atom (= $N_2 + C_2H_4$) or decomposes, probably to HCN + CH_3. See also [1662].

326. See also [240, 1626].

327. Obtained for the initial stage of the reaction; see remark 322. The given constant probably corresponds to the reaction of addition of an N atom to the olefin.

328. Turbulent mixing of the gas is assumed.

329. See, however, [143, 240, pp. 17-20; 1655, 1658].

330. Of the two values preference must probably be given to the lower value [762, 763]. See remark 342.

331. Calculated from the k of dissociation, measured at 6,000-10,000°; see [276].

332. See also [1015, 1016].

333. See, however, [276].

334. Calculated on the basis of the data of [309, 763], assuming that $k \sim T^{-\frac{1}{2}}$.

335. According to [763], k is temperature-independent in the interval 273-453°.

336. Obtained from the data of [276, 381, 965].

337. See also [240, p. 18]. The authors of [240] note the unpublished data of Thrush, according to which the E of N atom recombination is -0.975 ± 0.14.

338. According to [512] this number should be increased to 16.21.

339. M is a mixture of N_2 and N.

340. The decrease in the k of N atom recombination with increasing temperature also follows from theoretical calculations of this constant [148].

341. See also [1015].

342. Calculated by the least-squares method on the basis of [105, 276, 309, 324, 512, 763, 965, 1015]. Not taken into account were the high values of k, which may be due to the presence of impurities.

343. See also [13].

344. Given in [312] are the relative efficiencies of H_2, He, Ar, N_2, CO_2, N_2O and H_2O in the recombination of N + N, N + O, and also O + O, I + I, O + NO, $H + O_2$ and $O + O_2$, from the data of various authors.

345. M = O_2, O, N_0 or Ar. The formula was obtained on the basis of the statistical theory [908] using the data of [303] for the reaction $2O + Ar = O_2 + Ar$.

346. See also [240, 1655, 1656, 1657].

347. The figure $10^{15.59 \pm 0.04}$ is given in [240] with reference to Thrush's communication.

348. The theoretical value of the constant, calculated in [965], is 1.9×10^{15}. According to the calculations of [965], at high temperatures the constant should vary with the temperature as 1/T. A rough estimate of the constant of recombination of nitrogen and hydrogen atoms obtained in an electrical discharge yields $k_p = 2 \times 10^{15}$ at room temperature [891].

349. M = N_2 with an admixture of NO.

350. M = NO, O or N.

351. M = O_2, N_2 or Ar.

352. The authors do not rule out the mechanism N + C_2H_2 = CN + CH_2.

353. See also [1631]. In the absence of O_2 the rate of consumption of O is less by a factor of 3 to 5 than in the presence of O_2. This is explained quantitatively by the formation of HO_2 and by the reaction of O with HO_2.

354. Obtained on the basis of [78, 311, 394, 537, 1584, 1632].

355. Used were the data of [394, 1632] at 400°.

356. Obtained from [78, 537].

357. The error is estimated to be ±40%. E is chosen arbitrarily as 10.2.

358. Calculated by the least-squares method from the data of [387, 700, 806, 1584, 1632, 1700, 1707].

359. Calculated by the least-squares method on the basis of [972, 1586].

360. The O atoms were obtained as a result of the processes H + NO_2 = OH + NO, 2OH = H_2O + O.

361. Obtained on the basis of the data of [93, 394] and of K.

362. Calculated using the k of the inverse reaction. The authors of [895] have doubts about the possibility of representing the k of the reaction O + OH = O_2 + H by the Arrhenius formula.

363. Given in [892] is a value $\geq$ 12.78.

364. Given with reference to [450], where the k of the inverse reaction is determined at room temperature.

365. Formula obtained on the basis of measurements at 310° of the k of the inverse reaction, for which E is taken equal to 1, and of the equilibrium constant

$O + H_2O \rightleftarrows 2OH$, which can be represented by the formula

$$K = \frac{p_O p_{H_2O}}{p_{OH}^2} = 0.092 \exp\left(\frac{17{,}060}{RT}\right)$$

in the temperature interval 300-2,400°.

366. Calculated by the least-squares method, according to [242, 450, 474, 880, 892, 1028, 1583, 1623].

367. The formula $k = 10^{13.56} \exp\left(-\frac{8{,}700}{RT}\right)$ is given in [217] on the basis of E = 8.7, calculated by the Polanyi-Semenov rule, and of the value of k taken from [1022].

368. Obtained using $k = 1.95 \times 10^{13} \exp\left(-\frac{1{,}060}{RT}\right)$ for $^{18}O + {}^{18}ON^{18}O = {}^{18}O_2 + N^{18}O$ [941].

369. The formula must be considered as incorrect, since k_- obtained from it and from K is too great in value (3×10^7 at room temperature).

370. Calculated by Davidson on the basis of the data given in [631]. The authors of [489] show that according to their data, k at 3,000° should be 35% greater.

371. Given with reference to [631]. See also [706, 1134].

372. Given with reference to [631, 489]. This formula must probably be considered as being more accurate.

373. The formula was obtained using the data of [894], and also [388, 938, 1066] for the k of the inverse reaction.

374. This formula must obviously be considered more accurate. We note that the E of the inverse reaction (7.5) plus the reaction heat (32) yields E = 39.5.

375. See, however, [894, 899].

376. Calculation by the least-squares method from the data of [894, 1550] leads to the formula $k = 10^{12.92 \pm 0.96} \exp\left(-\frac{40{,}500 \pm 6{,}400}{RT}\right)$.

377. The ratio of the k of the given reaction to the k of the reaction $O + NO \rightarrow NO_2$ is 0.70.

378. It may be possible that the reaction being discussed here is $O + N_2O = 2NO$.

379. From another assumption as to the destruction of O atoms in [896], E ~ 26 [530]. Kaufman [891] assumes that the E of this process should be closer to 21. The rate constant in [896] is more in the sense of an estimate.

380. On the basis [896] the formula $10^{2.62} \exp\left(\frac{4{,}800}{RT}\right)$ is obtained for the ratio of the k of the given reaction to the k of the reaction $O + N_2O = 2NO$.

381. Calculated on the basis of [558, 896]. This formula must be taken as being the most accurate.

382. Formula obtained using the formula for the k of O_3 decomposition given in [869].

383. The given constant is the sum of the constants of $O + N_2O = 2NO$ and $O + N_2O = O_2 + N_2$. In the opinion of the authors of [558], the first is probably prevalent over the second. According to [896], the k of the second reaction is less than that of the first by a factor of 6 to 70 in the given temperature interval.

384. The ratios of the k of the given reaction to the k of the reaction $O + C_4H_8\text{-}1 \rightarrow C_4H_8O$ and to the k of the reaction $O + \text{iso-}C_4H_8 \rightarrow \text{iso-}C_4H_8O$ are equal respectively to 1.9 and 0.34.

385. According to [141] this figure should be increased by a factor of 1.6.

386. The author of [1416] considers the data of [941] to be more accurate than his own data.

387. This value was obtained from the measured ratio of the k of this reaction to that of the reaction $O + O_2 + N_2 = O_3 + N_2 (k_2)$, multiplied by the nitrogen concentration. According to [144], $k_2(N_2) = 2.8 \times 10^9$.

388. Obtained on the basis of measurements of the k of the reaction $O + O_2 + Ar = O_3 + Ar$ and of the data of [144, 145].

389. See also [1032].

390. This formula was obtained in [378] using a more accurate value for the heat of formation of O.

391. Obtained from the data of a number of authors.

392. See, however, [1366].

393. The ratio of the k of the given reaction to that of the reaction $O + O_2 + M = O_3 + M$ is $10^{5.92} \exp\left(- \frac{5,000 \pm 1,000}{RT}\right)$.

394. Obtained from the measured k ratio of the reactions $O + O_2 + O_2 = O_3 + O_2$ (1) and $O + O_3 = 2O_2$ (2), $\frac{k_2}{k_1} = 2 \times 10^{-5}$ and $k_1 = 10^{14.43}$ [901].

395. The authors of [1061] consider this figure to be more accurate than that obtained in [1241].

396. Schiff [1356] does not exclude the possibility that this figure is too high because of insufficient purification of the gas in the experiments carried out in [1241].

397. The formula was obtained using the data of [632].

398. The activation energy was taken from [144] with a correction for the correct value of the heat of dissociation of oxygen. See also [145].

399. Calculated by the least-squares method on the basis of [144, 145, 378, 397, 869, 991, 992, 1061, 1062, 1241, 1731, 1761]. A calculation by [144, 145, 869, 1731] (excluding the rest of the data) yields $k = 10^{13.15 \pm 0.11} \times \left(- \frac{5,000 \pm 220}{RT}\right)$.

400. It was shown in [1632] that the consumption of O does not depend on the presence of O_2.

401. See also [1631]. The complex reaction conditions and the number of assumptions made in calculating this constant make the formula obtained in [1631] not particularly reliable. The authors of [1631] believe that this formula expresses the rate constant of the disappearance of O atoms in the presence of a gas reacting with them (in particular, from 4 to 6 O atoms are expended for each molecule of H_2).

402. Calculated by the least-squares method on the basis of [1632, 1748].

403. The k ratio of the reactions $O + CH_2 = CO + 2H$ and $CH_2 + C_2H_2 \rightarrow C_3H_4$ is 2.7 ± 1.0.

404. The reaction is not reliably established.

405. Calculated from the data of [538].

406. Measured in the presence of oxygen as the carrier gas.

407. Measured in the presence of nitrogen as the carrier gas.

408. A minimum of 8 O atoms is expended for each molecule of CH_4.

409. According to [1678], k is the total constant of the indicated reaction and of the reaction $O + CH_4 = CH_2 + H_2O$.

410. $O + CH_4 = CH_2 + H_2O$ is taken in [1427] as the limiting process for the reaction of atomic hydrogen with methane and is assigned the measured activation energy 8.1. Not ruled out is the possibility that this process is $O + CH_4 = OH + CH_3$ [1424, p. 601].

411. Calculated by the least-squares method on the basis of the data of [13, 245, 539, 1584, 1633, 1678, 1695, 1704, 1710 and 1711].

412. The rate constant of the reaction $O + C_4H_8\text{-}1 \rightarrow C_4H_8O$ is taken as $10^{13.184} \times \exp\left(-\frac{1,200}{RT}\right)$.

413. The authors of [1678] believe that the given reaction takes place according to the scheme $O + C_2H_6 = HCHO + H_2 + CH_2$.

414. Calculated by the least-squares method on the basis of the data of [1584, 1678].

415. The difference in E of the given reaction and of the reaction of O with C_3F_6 is 1.6.

416. See also [1547].

417. Calculated on the basis of the measured (in [574]) value of k of the reaction of O with cis-2-pentene and of the measured (by Svetanovic) k ratios of the reactions of O atoms with various compounds.

418. According to [416], at 24°C the k of the reaction $O + n\text{-}C_4H_{10} = OH + C_4H_9$ is less by a factor of 22 ± 5 than the k of the reaction $O + C_2H_4 \rightarrow C_2H_4O$.

419. The author of [1641] states that this reaction probably takes place with rupture of the C-C bond. The rate constant of the total reaction is $10^{9.82}$.

420. Determined from the measured ratio of the k of the given reaction to that of the reaction $O + C_3F_6 \rightarrow C_3F_6O$.

421. On the basis of an analysis of the reaction products the authors of [1680] adopted the following scheme: $O + C_4H_{10} = HCHO + H_2 + CH_2CH_2CH$ (k_1) and $O + C_4H_{10} = CH_3CHO + H_2 + CH_3CH$ (k_2); $\frac{k}{2} = k_1 = k_2$.

422. Calculated by the least-squares method on the basis of the data of [507, 1046, 1703], which are probably the most reliable.

423. See remark 419. The rate constant of the total reaction is $10^{9.56}$.

424. See remark 419. The rate constant of the total reaction is $10^{9.56}$.

424a. The Arrhenius equation is not fulfilled. An approximately straight line is obtained only in the interval 225-380° with E ≅ 1.5. The authors consider the following mechanism to be the most probable:

$$O + C_2H_4 = \underset{\diagdown O \diagup}{H_2C\text{——}CH_2^*} = HCHO + CH_2.$$

425. The authors take k as corresponding to the sum of the two reactions.

426. This formula must evidently be considered the closest to actual fact, as well as the values of k measured at room temperature.

427. The ratio of the k of the given reaction to the k of the reaction $O + C_2F_4 = CF_2O + \ldots$ is expressed by the formula $10^{1.17} \exp\left(-\frac{2{,}600}{RT}\right)$.

428. The authors of [1682] do not rule out the parallel occurrence of other reactions. The given formula yields $10^{9.52}$ for room temperature, a value which

is two orders lower than those measured in [417] and [574].

429. According to [542], k is weakly dependent on the temperature. The authors do not exclude the possibility of the reaction $O + C_2H_2 = HC_2O + H$.

430. The difference in E between the given reaction and the reaction of O with C_3F_6 is 1.2.

431. The authors of [1444] leave the question of the products of this reaction open, although they believe the splitting off of the H atom to be probable. Calculated in terms of the k of the reaction of O with C_3F_6, $k = 7.7 \times 10^{11} \exp\left(-\frac{2,200}{RT}\right)$ [1359].

432. From an analysis of the reaction products the authors of [1681] conclude that CO and aldehydes are formed primarily as a result of the attack of the O atom. See, however, [891].

433. The authors of [1681] associate the constant they measured with ring fracture.

434. Calculated by the least-squares method on the basis of [1444, 1681].

435. The following relationship was obtained for the reactivities of the different groups in the C_2H_5OH molecule at 700–800°C: $CH_3:CH_2:OH = 3.3:2.8:1.0$.

436. The ratio of the k of the given reaction to the sum of the rate constants of this reaction and of the reaction of $O + HCO = CO_2 + H$ is 0.8 ± 0.1.

437. See [1424, p. 599].

438. Obtained on the basis of [595, 1182].

439. It was shown in [417] that at room temperature the rate of the reaction of O with CH_3CHO amounts to 0.7 ± 0.1 of the rate of the reaction of O with C_2H_4. The recommended value for the k of the last reaction was used.

440. The formula $k = 10^{13.80} \exp\left(-\frac{4,700}{RT}\right)$ was obtained in [1462]. The authors of [1049] state that a formula intermediate between the formulas of [1049] and [1462] should be closer to reality.

441. Obtained on the basis of the measured ratio of the k of the given reaction to that of the reaction $O + CH_4 = OH + CH_3$, $1.1 \exp\left(\frac{870}{RT}\right)$ and to the k of the last reaction $k = (1.7 \pm 0.2) \times 10^{13} \exp\left(-\frac{8,700}{RT}\right)$ [1584].

442. The ratio of the k of the given reaction to the k of the reaction $O + C_2H_4 \rightarrow$ products is 1.03. The recommended k was taken for the latter. The ratio of the k of the given reaction to the reaction $O + C_4H_8\text{-}1 \rightarrow$ products is 0.23.

443. The following formulas were obtained for the ratio of the k of the reactions $O + C_2H_4 \rightarrow C_2H_4O$, $O + C_3H_6 \rightarrow C_3H_6O$, $O + C_4H_8\text{-}1 \rightarrow C_4H_8O$ and $O + C_2H_2 = CH_2 + CO$ (?) to the k of the given reaction: $10^{0.646} \exp\left(-\frac{920}{RT}\right)$, $10^{0.60 \pm 0.04}$, $10^{0.992} \exp\left(-\frac{620}{RT}\right)$ and $10^{1.17} \exp\left(-\frac{2,600}{RT}\right)$. The rate constant was calculated on the basis of the first of these ratios and of the recommended k for the first of the given reactions.

444. The ratio of the k of the given reaction to that of the reaction $O + C_3F_6 = CF_3CFO + CF_2$ is 6.5 and the ratio of the sum of the rate constants of the reactions $O + C_3F_6 = FCFO + CF_3CF$ and $O + C_3F_6 = CF_3CFO + CF_2$ to the k of the reaction $O + O_2 + M = O_3 + M$ is 1.85×10^{-5}. The ratio of this sum to the k of the reaction $O + C_2H_4 =$ products is 3.45×10^{-2}.

445. See also [747].

446. The following formulas were obtained for the ratio of the k of the reactions $O + C_2H_6 = OH + C_2H_5$, $O + C_3H_8 = OH + C_3H_7$, $O + C_2H_4 \rightarrow C_2H_4O$ and $O + C_3H_6 \rightarrow C_3H_6O$ to the k of the given reaction: $10^{0.65} \exp\left(-\frac{2,100}{RT}\right)$, $10^{0.85} \exp \times \left(-\frac{1,600}{RT}\right)$, $10^{0.974} \exp\left(\frac{650}{RT}\right)$ and $10^{1.43} \exp\left(-\frac{1,200}{RT}\right)$.

447. $(M) > 1.7 \times 10^{-8}$.

448. Recalculated in [1140] from the data of [1311] with allowance for the heterogeneous destruction of O atoms.

449. Given in [148] are the theoretical values of the constants of recombination of H, N and O atoms and of N atoms with O, which differ but little from the measured values. From theory it follows that the constant k_p in these cases should vary in inverse proportion to the temperature.

450. This formula was obtained by the least-squares method from the data of [301, 701, 1323, 1636]. The remaining values given in the table for the k of recombination of O atoms on argon were not taken into account, since it is highly probable that their high value is due to the presence of impurities.

451. The temperature dependence $k_p \sim T^{-1}$ was taken arbitrarily. A decrease in the constant k_p with increasing temperature also follows from theoretical calculations of this constant [148, 1008]. The inverse dependence of k_p on T obtained in [1666] was doubtlessly due to experimental errors.

452. It was shown in this reference that the ratio of the efficiencies of the various molecules of M is $N_2:Ar:He:N_2O:CO_2:SF_6 = 1:\leq 0.3:0.3:1.4:3.0:3.0$. The authors view the figure given in [1139] as preliminary.

453. Calculated by the least-squares method on the basis of [1015, 1139, 1140].

454. The large scatter of the values of k is attributed to the difficulty in allowing for the contribution of the reaction $O + O_2 + O_2 = O_3 + O_2$, which competes with the given reaction at small concentrations of O atoms, and also to the possible disagreement between the rates of recombination and formation of O_2 when measuring the recombination rate from the absorption spectrum of O_2 in the ground state, since a portion of the molecules could have been formed in the excited state (see [891, p. 281]).

455. See the critical comments in [900].

456. The authors of [966] note the low accuracy in determining k.

457. Calculated by the least-squares method on the basis of [275, 304, 635, 891, 900, 925, 1055, 1065, 1323, 1324, 1741].

458. The relation $k \sim T$ obtained by the author must be considered erroneous.

459. When p = 7-25 mm Hg the second-order k does not depend on the pressure. The authors state that this indicates the long lifetime of CO_2^*.

460. M = N or NO.

461. Mixture of O_2 and Xe.

462. Given for M = Ar is a rate constant equal to the quantity $\frac{k_3 k_4}{k_5}$, where k_3, k_4 and k_5 are the k of the processes $O + CO + M = CO_2 + M$ (3), $CO_2' = CO_2 + h\nu$ (4) and $CO_2' + M = CO_2 + M$ (5). Values of k for He, Ne, O_2 and N_2 are also given in [393].

463. The activation energy was calculated using the data of [393]. The low value of k is connected with the extinction of luminescence [393].

464. See also [392].

465. The order 3 was chosen arbitrarily by the authors of [214]. The figure 2×10^{13}, which is the mean value of k, is given as a lower limit. The upper limit is less than 1×10^{14}. Apparently the reaction has a negative temperature coefficient.

466. Obtained using the k of the reaction $O + O_3 = 2O_2$, $k = 10^{13.26 \pm 0.35} \exp \times \left(- \frac{4,100 \pm 500}{RT}\right)$. See page 67.

467. See [1289, 1172b].

468. $M = CO + O_2$.

469. Given in [725] is the formula $k = 10^{12.255} \exp\left(- \frac{2,000}{RT}\right)$.

470. Obtained on the basis of the data of [393, 1739].

471. Obtained from the measured ratio of the k of the reaction $O + O_3 = 2O_2$ to the k of the given reaction, $(4.37 \pm 1.67) \times \exp\left(- \frac{6,680 \pm 360}{RT}\right)$, and the k of the first reaction, $k = 10^{13.26 \pm 0.35} \exp\left(- \frac{4,100 \pm 500}{RT}\right)$ [1731]; $M = O_2 + CO$.

472. Mixture of CO, O_2 and N_2.

473. Calculated for a mean temperature of 490° from the measured ratio of the k of the reaction $O + O_3 = 2O_2$ (2) to the k of $O + CO + M = CO_2 + M$ (3). The rate constant of the first of these reactions was taken from [1731]. From the data of [604] it follows that $\frac{k_2}{k_3} = 10^{1.4} \exp\left(- \frac{5,380}{RT}\right)$. The author concludes that $E_3 \simeq 0$.

474. The authors find that the reaction follows a second-order law even at such a

low pressure as 0.2 mm Hg, which is possible only if the lifetime of the quasi-molecule COO exceeds 10^{-5} sec.

475. The authors of [1669] and [1670] find that the reaction $O + CO \rightarrow CO_2$ takes place under the experimental conditions (p = 4.2 mm Hg) according to a second-order law.

476. Total pressure (CO in an excess of O_2) is 2.5-3.7 mm Hg.

477. The given figure, which is the rate constant of formation of the activated complex, was obtained using the data on isotopic exchange [766].

478. It was shown in [568] that the discrepancy (of several orders) between the value of k obtained in [449] and the data of other studies is due to the presence of excitation mechanisms.

479. The rate constant was obtained assuming that the collision of NO and O and the radiation of light are one elementary act. But on the basis of the idea that the spectrum observed during the interaction of O with NO is not continuous (and also on the basis of kinetic data) the authors of [241] believe that the process $O + NO = NO_2 + h\nu$ is ruled out.

480. In contrast to [567], where the light yield was measured over the entire transmission spectrum of NO_2, k was estimated in [889] from the radiation intensity at 5,500 A.

481. Obtained on the basis of the data of [392, 567, 997].

482. Calculated by the least-squares method on the basis of [255, 392, 567, 879, 889, 997].

483. The authors of [505] find that He, Ar and O_2 are equally efficient.

484. The author considers the efficiencies of N_2, O_2 and Ar to be the same.

485. See also [891].

486. Given in [903] are the k of the reaction $O + NO + M = NO_2 + M$ for various M. The relative efficiencies are $He:Ar:O_2:N_2:CO_2:N_2O:CH_4:NF_4:SF_6:H_2O$ =

0.83:1.00:1.00:1.55:2.17:2.17:2.34:2.34:2.67:6.33; $k(M = O_2) = 10^{16.33\pm0.07}$.

487. According to [392], the NO_2 formed in this reaction is in the electronically excited state.

488. Calculated by the least-squares method on the basis of [392, 558, 1195, 1582].

489. Obtained from the measured (in [558]) k of the inverse reaction and from K.

490. It is indicated that CO_2 and N_2O are about 1.5 times more efficient than O_2.

491. $M = O_2$, Ar or He.

492. $M = O_2$, N_2 or Ar.

493. See also [861].

494. CO_2 or N_2O.

495. Mixture of O_2 with Ar.

496. Mixture of N_2O and NO.

497. See also [904].

498. Obtained using the data of [144, 145, 378, 632, 869, 901, 1320, 1660].

499. Obtained using the data of [378, 869, 901] and data on the thermal decomposition of ozone [145, 632, 1320, 1660].

500. The relative efficiencies of the M particles in the reaction $O + O_2 + M = O_3 + M$ at 295 ± 3°:

O_2	N_2	CO	CO,Ar	Ar	He	O_3	CO_2,N_2O	SF_6	Literature
1	0.93	-	-	-	0.78	2.3	2.4	-	[144]
1	1	-	1	-	-	-	10	-	[889, 890]
1	0.89	-	-	0.57	0.77	2.3	2.2	-	[327]
1	1	-	1	-	-	-	2.6	-	[505]
-	1[a]	-	0.05	-	0.16	-	0.8	0.14	[1075]
1[b]	0.5	-	0.1	-	0.2	-	1	-	[159]
1	0.28	0.62	-	0.22	0.13	-	0.8	-	[928]

a) Here the efficiency of nitrogen is taken to be 1.
b) These figures characterize the retardation of O_3 photolysis.

There are no signs of a variation in relative efficiency with temperature [378].

501. The relative efficiencies are $Ar:He:CO_2:N_2O = 1.0:0.8:5:5$.

502. Obtained on the basis of the data of [145, 869].

503. Calculated by the least-squares method on the basis of [377, 378, 395, 869, 904, 1160, 1355, 1731].

504. See also [1538]. Not taken into account was the reverse diffusion, which may be of considerable significance under the experimental conditions of [505, 891, 900]. The relative efficiencies are $O_2:He:Ar:CO_2 = 1.0:1.0:1.0:2.6$. Indications of the presence of substantial quantities of excited O_2 molecules formed in the discharge were obtained in [505].

505. Obtained taking diffusion of O atoms into account. Without allowance for diffusion we get 4.6×10^{14} (instead of 6.0×10^{14}).

506. The figure $10^{14.02 \pm 0.24}$ was obtained in [454] on the basis of the data of [966].

507. Calculated from the data of a number of authors, taking into account exchange phenomena in the system O-O_2-O_3.

508. The authors disregard the recombination of O atoms at the walls. Therefore, the values of k they obtained must be considered as somewhat high [900].

509. The efficiencies at 298° are $O_2:He:Ar:CO_2 = 1.0:0.74:0.90:3.1$.

510. Calculated by the least-squares method on the basis of the data of [110, 145, 505, 964].

511. The formula in [144, 145] must probably be considered as the most accurate.

512. According to [632] the ratio of the efficiencies of O_2 and O_3 is 0.3 ± 0.05.

513. According to [505] the relative efficiencies are $O_2:He:Ar:CO_2 = 1.0:1.0:1.0:2.6$.

514. Obtained on the basis of [505, 904, 1160].

515. While noting the sharp difference (better than one order) between the value of k measured by them and the values obtained earlier in [889, 1940], the authors find no explanation for this difference. In view of the fact that the values of k differ by a factor of less than 2 in earlier studies, they must evidently be considered as being closer to the true value.

516. The authors of [1155] believe all the previously obtained values of k to be too high because of the failure to take the adsorption of O atoms at the walls of the reactor into account.

517. The authors find that the k of the given reaction is appreciably greater than the k of the reaction $O + O_2 + SO_2 = O_3 + SO_2$.

518. Mixture of SO_2 and NO_2.

519. M is flame gas. The rate constant was calculated on the basis of the estimated (in [545]) value, at 1,650°, of the k of the reaction $O + SO_3 = O_2 + SO_2$ ($k = 1 \times 10^{12}$).

520. Obtained from experimental data in [573].

521. Obtained from the measured ratio of the k of the given reaction to the k of the reaction $O + O_2 + N_2 = O_3 + N_2$ [144]. See also [575].

522. Calculated on the basis of data obtained under the assumption that $k \cong 5 \times 10^{14}$ for the reaction $O + NO_2 = NO_3^*$ [570]. But this assumption contradicts the data of [941].

523. According to [416] the reaction of O with C_2H_4 at 300-400° takes place in accordance with the scheme $O + C_2H_4 \rightarrow C_2H_4O^* \rightarrow CH_3 + CHO$ or $CH_3 + H + CO$. Shock stabilization of $C_2H_4O^*$ leads to C_2H_4O.

524. Given in [420] is the ratio of the k of the given reaction to the k of the reaction of O with cyclohexane at 25°C and 127°C, and also the ratio of the pre-exponential factors and the difference in E between the given reaction and the reaction of O with cyclopentene.

525. See also [418]. Calculations on the basis of the measured k ratio of the

reaction of O atoms with the given compound and with isobutene; chosen for the latter was $k = 1.3 \times 10^{13}$ [574].

526. Given in [1359] is $k = 10^{13.20} \exp\left(-\frac{2,600}{RT}\right)$.

527. The ratio of the k of the given reaction to the k of the reaction $O + H_2CCHCH_3 \rightarrow C_3H_6O$ is 0.17.

528. The ratio of the k of the given reaction to the k of the reaction $O + C_2F_4 = CF_2 + \ldots$ is expressed by the formula $10^{0.65} \exp\left(-\frac{920}{RT}\right)$.

529. Obtained on the basis of the data of [420, 574].

530. On the basis of an analysis of the reaction products, the authors of [1679] relate the k they measured to the formation of the complex C_2H_4O, which decomposes into $HCHO + CH_2$.

531. Calculated by the least-squares method on the basis of [418, 419, 420, 504, 507, 574, 1359].

532. The ratio of the k of the given reaction to the k of the reaction $O + C_2F_4 = CF_2O + \ldots$ is 4.

533. Calculated from the measured ratio of the k of the given reaction to the k of the reaction $O + NO_2 = O_2 + NO$. The value for the latter was taken from [941].

534. The ratio of the k of the given reaction to the k of the reaction $O + C_2F_4 = CF_2O + \ldots$ is expressed by the formula $10^{0.99} \exp\left(-\frac{620}{RT}\right)$.

535. Obtained from the measured ratio of the k of the given reaction to the k of the reaction $O + CS_2 = SO + CS$. The reasons for the discrepancy (by a factor of less than or equal to 2) between the data of the various authors are discussed in [1416] (as well as in [504]).

536. Given are the ratios of the pre-exponential factors of the k of the given reaction and of the reaction of O addition to cyclopentene and the difference in activation energies. See also [1416].

537. The ratio of the k of the given reaction to the k of the reaction

$O + H_2CCHCH_3 \rightarrow C_3H_6O$ is 4.8.

538. Calculated on the basis of [504, 574, 1353]. The results of [1416] agree with those calculated by the given formula, within the limits of the measurement accuracy.

539. Given in [420] is the ratio of the k of the given reaction to the k of the reaction of O with cyclopentene, the ratio of the corresponding pre-exponential factors and the difference in E (on the basis of measurements at room temperature and at ~125°C).

540. The ratio of the k of the given reaction to the k of the reaction $O + H_2CCHCH_3 \rightarrow C_3H_6O$ is 0.50.

541. The ratio of the k of the given reaction to the k of the reaction $O + H_2CCHCH_3 \rightarrow C_3H_6O$ is 0.21.

542. The ratio of the k of the given reaction to the k of the reaction $O + H_2CCHCH_3 \rightarrow C_3H_6O$ is 0.61.

543. The ratio of the k of the given reaction to the k of the reaction $O + H_2CCHCH_3 \rightarrow C_3H_6O$ is 0.45.

544. The ratio of the k of the given reaction to the k of the reaction $O + H_2CCHCH_3 \rightarrow C_3H_6O$ is 0.011.

545. The ratio of the k of the given reaction to the k of the reaction $O + C_4H_8\text{-}1 \rightarrow C_4H_8O$ is 0.077.

546. The ratio of the k of the given reaction to the k of the reaction $O + H_2CCHCH_3 \rightarrow C_3H_6O$ is 0.086.

547. The activation energy is estimated to be 27 ± 6. The difference in E of the reactions $S + COS = SO + CS$ and $S + COS = S_2 + CO$ is about 19.

548. A survey of the reactions of sulfur atoms is given in [697].

549. M corresponds to a mixture of COS with Ar or N_2.

550. M corresponds to a mixture of CS_2 with Ar or N_2.

551. The k of the reaction Se + $C_2H_4 \rightarrow CH_2SeCH_2$ was used [292].

552. The formula for the k of the reaction F + C_2H_6 = HF + C_2H_5, $k = 1.00 \times 10^{13} \times \exp\left(-\frac{280}{RT}\right)$, was used as a standard. Obtained in [1109] for the k ratio of the reactions F + H_2 = HF + H (k_1) and F + CH_4 = HF + CH_3 (k_2) in the range 298-423° was $\frac{k_2}{k_1} = 1.05 \exp\left(\frac{500 \pm 200}{RT}\right)$.

553. Calculated on the basis of collision theory.

554. The activation energy was taken arbitrarily equal to zero.

555. See also [581].

556. According to [31], the k ratio of the reactions F + n-C_4H_{10} = HF + $CH_2CH_2CH_3$ (k_P) and F + n-C_4H_{10} = HF + $CH_3CHCH_2CH_3$ (k_S) at temperatures of 298 and 459° can be expressed by the formula

$$\frac{k_S}{k_P} \approx 1.1 \exp\left(\frac{97 \pm 20}{RT}\right)$$

and the k ratio of the reactions F + iso-C_4H_{10} = HF + $CH_2(CH_3)_2CH$ (k_P) and F + iso-C_4H_{10} = HF + $(CH_3)_3C$ (k_T) at 298° is

$$\frac{k_T}{k_P} = 1.39 \pm 0.16.$$

557. Given in [581] are the relative values of the k of splitting the H atom from the groups CH_2X, CH_2 and CH_3. The k of the reactions F, Br + $CH_2XCH_2CH_2CH_3$ = HF, HBr + $CH_2XCH_2CH_2CH_2$ (X = H, F, Cl) was taken as unity. The given value of k was obtained for the k of the standard reaction $10^{13.45}$.

558. Obtained on the basis of [43, 1330, 1436].

559. $(1.24 \pm 0.03)\exp\left(\frac{490 \pm 6}{RT}\right)$ was obtained for the k ratio of the reactions of Cl with H_2 and HD. The formula given in the table was obtained on the basis of $k_{Cl+H_2} = 10^{13.92\pm0.03} \exp\left(-\frac{5{,}480 \pm 140}{RT}\right)$ [547].

560. The measured k ratio of the reactions of Cl with H_2 and D is $(1.44 \pm 0.06) \times \exp\left(\frac{1{,}128 \pm 17}{RT}\right)$. The formula $k = 10^{13.92\pm0.03} \exp\left(-\frac{5{,}480 \pm 140}{RT}\right)$ was taken for the k of the first reaction [547]. See also [948].

561. The k ratio of the reactions Cl + H_2 = HCl + H (1) and Cl + D_2 = DCl + D (2) at 273 and 305° is 13.4 and 9.75, from which we get $E_2 - E_1 = 1.63$ and $A_1:A_2 = 0.66$. The value $E_1 = 5.5$ was taken from [43]. See also [547].

562. The k ratio of the reaction of Cl with H_2 and D_2 at T = 303° found in [521] was ≈ 3.

563. The rate constant of the reaction $Cl + H_2 = HCl + H$ was taken as $k = 10^{13.92} \exp\left(-\frac{5,480}{RT}\right)$ [547].

564. Calculated by the least-squares method on the basis of [344, 1232].

565. $(1.35 \pm 0.03)\exp\left(\frac{552 \pm 7}{RT}\right)$ was obtained in [868] for the k ratio of the reactions of Cl with H_2 and HF. The formula $k_{Cl+H_2} = 10^{13.92} \exp\left(-\frac{5,480}{RT}\right)$ was chosen for the reaction of Cl with H_2 [547].

566. The measured ratio of the k of the reaction $Cl + H_2 = HCl + H$ to the k of the given reaction is $(1.27 \pm 0.03)\exp\left(\frac{797 \pm 14}{RT}\right)$. The formula $10^{13.92\pm0.03} \times \exp\left(-\frac{5,480 \pm 140}{RT}\right)$ was taken for the k of the first reaction [547].

567. The measured k ratio of the reactions of Cl with H_2 and DT is $1.534 \exp\left(\frac{1,422}{RT}\right)$. The formula $k = 10^{13.92\pm0.03} \exp\left(-\frac{5,480 \pm 140}{RT}\right)$ was chosen for the k of the first reaction [547].

568. The measured k ratio of the reactions of Cl with H_2 and I_2 is $1.54_5 \exp\left(\frac{1,693}{RT}\right)$. The formula from [547] was chosen for the k of the first reaction.

569. Obtained using the k for $Br + Br + CO_2 = Br_2 + CO_2$ [1300].

570. Obtained assuming that the k of recombination of I and Cl atoms are equal.

571. Calculated from the k of the reaction of $H + HCl = H_2 + Cl$ [1436], from the ratio of the k of the latter to the k of the reaction $H + Cl_2 = HCl + Cl$, $0.14 \exp\left(-\frac{1,540}{RT}\right)$ [944], and from the K of $Cl + HCl \rightleftharpoons Cl_2 + H$.

572. Recalculated using the recommended formula for the k of the reaction $HCl + H = H_2 + Cl$.

573. The ratio of the k of the reaction $Cl + ClO_2 = Cl_2 + O_2$ to the k of the given reaction is $10^{1.03\pm0.15}$.

574. See, however, [268].

575. A calculation on the basis of the data of [268] and of the thermochemical data of [1765] yields $k = 10^{15.26} \exp\left(-\frac{21{,}050}{RT}\right)$.

576. Calculated using the k of the reaction $Cl + H_2 = HCl + H$ [547].

577. This constant was obtained from its measured (in [1276]) ratio to the rate constant of the reaction $Cl + H_2 = HCl + H$, $k = 0.79 \times 10^{14} \exp\left(-\frac{5{,}500}{RT}\right)$.

578. Obtained from the measured k ratio of the given reaction and of the reaction $Cl + H_2 = HCl + H$, $10^{0.59} \exp\left(-\frac{1{,}700}{RT}\right)$, and of the last reaction.

579. Obtained using the k of the reaction $Cl + CH_4 = HCl + CH_3$ [947].

580. Obtained using the k of the reaction $Cl + CH_4 = HCl + CH_3$, $k = 2.4 \times 10^{13} \times \exp\left(-\frac{3{,}830}{RT}\right)$. See also [346].

581. Obtained using the k of the reaction $Cl + C_2H_6 = HCl + C_2H_5$, $k = 10^{13.95} \times \exp\left(-\frac{1{,}020}{RT}\right)$ [547].

582. See also [947].

583. Obtained using the k of the reaction $Cl + CH_4 = HCl + CH_3$, $k = 2.4 \times 10^{13} \times \exp\left(-\frac{3{,}830}{RT}\right)$ [547].

584. The formula $1.8 \exp\left(\frac{480 \pm 70}{RT}\right)$ was obtained for the k ratio of the splitting of secondary (k_S) and primary (k_P) H atoms from $n\text{-}C_4H_{10}$.

585. Taken as standard is the k of the reaction $Cl + n\text{-}C_4H_{10} = HCl + n\text{-}C_4H_9$, $k = 10^{13.92} \exp\left(-\frac{770}{RT}\right)$.

586. The formula $2.1 \exp\left(\frac{540 \pm 70}{RT}\right)$ was obtained for the k of splitting of tertiary (k_T) and primary (k_P) H atoms from $iso\text{-}C_4H_{10}$.

587. Obtained by the least-squares method on the basis of [949, 951, 1276].

588. The k of the reaction $Cl + CH_4 = HCl + CH_3$ was used, $k = 10^{13.37 \pm 0.17} \times \exp\left(-\frac{3{,}850 \pm 60}{RT}\right)$ [949].

589. See also [951].

590. Obtained on the basis of [947, 1276] using the k of the reaction $Cl + CH_4 = HCl + CH_3$, $k = 2.4 \times 10^{13} \exp\left(-\frac{3{,}830}{RT}\right)$.

591. Obtained on the basis of $k = 2.4 \times 10^{13} \exp\left(-\frac{3{,}850}{RT}\right)$ for $Cl + CH_4 = HCl + CH_3$ [949].

592. Obtained on the basis of [947] using the k of the reaction $Cl + CH_4 = HCl + CH_3$ [547].

593. The k ratio of the given reaction and of the reaction $Cl + C_2Cl_4 \rightarrow C_2Cl_5$(?) is $10^{3.20} \exp\left(-\frac{7{,}000}{RT}\right)$.

594. Obtained using $k_{Cl+CHCl_3}$ [947].

595. $(1.4 \pm 0.2)\exp\left(\frac{710 \pm 90}{RT}\right)$ was obtained in [1179] for the k ratio of the reactions of Cl with $CHCl_3$ and $CDCl_3$.

596. Obtained on the basis of [1179, 947] using the k of the reaction $Cl + CH_4 = HCl + CH_3$ [947].

597. Obtained using the k of the reaction $Cl + CHCl_3 = HCl + CCl_3$, $k = 10^{12.84} \times \exp\left(-\frac{3{,}320}{RT}\right)$ [547].

598. The k ratio of the reactions $Cl + CH_3I = CH_3Cl + I$ and $Cl + CH_3I = HCl + CH_2I$ is $6 \times 10^4 \exp\left(-\frac{9{,}000}{RT}\right)$.

599. Given with reference to [949, 1275], where this reaction is not considered. Obtained using the k of the reaction $Cl + CH_4 = HCl + CH_3$, $k = 1.2 \times 10^{13} \times \exp\left(-\frac{3{,}830}{RT}\right)$.

600. Obtained from the measured ratio of the k of the given reaction to the k of the reaction of Cl with C_2H_5Cl, as determined in [1276].

601. The formula was chosen arbitrarily.

602. Obtained from the measured ratio of the k of the given reaction to the k of the reaction of Cl with methyl chloride and the k of the last reaction, as determined in [947].

603. If the ratio of the k of the given reaction to the k of the reaction of $Cl + CH_3Cl = HCl + CH_2Cl$ (standard reaction) given in Table 2 of [362] is correct, lg A should be expressed by the value 12.83.

604. The following primary step of pyrolysis is accepted: $(CH_2Cl)_2 \rightarrow C_2H_4 + Cl_2$ with an activation energy of 72. E = 5 was chosen arbitrarily.

605. Calculated by the least-squares method from [182, 1508].

606. The ratio of the k of this reaction to the k of the reaction $Cl + C_2H_3Cl_2 \rightarrow$ products is $10^{2.1} \exp\left(\frac{3,000}{RT}\right)$. Cited in [804] with reference to [106, 107, 108, 803].

607. Obtained from the measured ratio of the k of the given reaction to the k of the reaction of Cl with chloroform, as determined in [947].

608. Obtained on the basis of [636, 947] using the k of the reaction $Cl + CH_4 = HCl + CH_3$, $k = 2.4 \times 10^{13} \exp\left(-\frac{3,830}{RT}\right)$.

609. See also [346, 499].

610. Obtained on the basis of the accepted k values of the reactions $Cl + n\text{-}C_4H_{10} = HCl + CH_2CH_2CH_2CH_3$ (1), $Cl + n\text{-}C_4H_{10} = HCl + CH_3CHCH_2CH_3$ (2), $Cl + CH_2FCH_2CH_2CH_3 = HCl + CH_2FCH_2CHCH_3$ (3) and $Cl + CF_3CH_2CH_2CH_2CH_3 = HCl + CF_3CH_2CH_2CHCH_3$ (4): $k_1 = 10^{13.2} \exp\left(-\frac{800}{RT}\right)$ and $k_2 = k_3 = k_4 = 10^{13.3} \times \exp\left(-\frac{300}{RT}\right)$ [949]. The authors of [598] consider their formulas to be highly approximate.

611. See [1216].

612. According to [380], the re-examined data of [812] agree with the data of [380].

613. See, however, [75].

614. Mentioned in [75] are the errors committed in [1018] in estimating the Cl concentration, which explains the excessively low value of k.

615. According to [811], the recombination of chlorine atoms is accomplished in the following two stages: $Cl + Cl_2 \rightarrow Cl_3$, $Cl_3 + Cl = 2Cl_2$.

616. CCl_4 is ≃ 6.5 times more efficient than Cl_2. In contrast to [775], it was established in [345] that Cl_2 is at least five times more efficient than Ar (and also SF_6) and is 6.5 times less active than CCl_4. From [1541] it follows that Cl_2 is considerably more efficient (by a factor of 20 to 60) than Ar. A decrease in the constant of Cl atom recombination with increasing temperature ($k_p \sim T^{-2}$) was found in [345].

617. Obtained by the least-squares method on the basis of [75, 345, 811].

618. M corresponds to compositions of from 0.04 Cl_2 + 0.96 Ar to 0.25 Cl_2 + 0.75 Ar.

619. M corresponds to a mixture of 0.05 Cl_2 + 0.95 Ar. In the opinion of the authors, Cl_2 is considerably more efficient than Ar.

620. Obtained from the k of the reverse reaction, measured in [41], and from the equilibrium constant.

621. Obtained by the least-squares method on the basis of [47, 364].

622. Estimate. M corresponds to a mixture of O_2 with Cl_2.

623. Mixture of Cl_2 and O_2.

624. Obtained from the measured k relation using the k of the reaction $Cl + CHCl_3 = HCl + CCl_3$, $k = 10^{12.84} \exp\left(-\frac{3,350}{RT}\right)$ [947]. The authors do not rule out the fact that the k of $Cl + CCl_3 \rightarrow CCl_4$ does not depend on the temperature. In this case they take $k = 10^{13.8}$.

625. The authors also do not rule out the reaction $Cl + C_2HCl_4 = HCl + C_2Cl_4$ or $Cl_2 + C_2HCl_3$.

626. Calculated from the measured k ratio of the given reaction and the reaction $Cl + C_2H_6 = HCl + C_2H_5$. The rate constant of the latter is taken to be 1.5×10^{13} [949].

627. The relative efficiencies are $Cl_2:C_2H_4:C_2H_6:SF_6:CO_2$ = 1.00:1.29:2.89:0.70:1.08.

628. Cited with reference to [346, 636].

629. See also [499].

630. The authors of [64] show that hot radicals are formed in this reaction.

631. Obtained from the experimental data of [63], assuming that $E = 0$.

632. Obtained from the measured ratio of the k of the given reaction to the k of the reaction $Cl + C_3H_8 = HCl + C_3H_7$, $k = 10^{14.01} \exp\left(-\frac{980}{RT}\right)$ [547].

633. The temperature is not mentioned.

634. See also [456].

635. All the cited data were obtained by Goldfinger and his colleagues. Apparently, the formula proposed in [547] must be considered more accurate.

636. The ratio of the k of the given reaction to the k of the reaction $Cl + C_2HCl_5 = HCl + C_2Cl_5(k)$ is $10^{3.8} \exp\left(\frac{5{,}720}{RT}\right)$. The formula was obtained with $k = 10^{12.68} \exp\left(-\frac{3{,}400}{RT}\right)$ [547].

637. The recommended formula for the k of the reaction $Cl + CHCl_3 = HCl + CCl_3$ was used.

638. The data of [198] were recalculated in [233] on the basis of the more exact equilibrium constant of $Br_2 \rightleftarrows 2Br$.

639. Recalculated in [233] on the basis of the more exact equilibrium constant of $Br_2 \rightleftarrows 2Br$. See also [547, 1227].

640. Obtained from the data of [233] and the corrected data of [69, 197].

641. Calculated by the least-squares method on the basis of [69, 198, 233, 937, 1000]. For the interval 550-980°, on the basis of [69, 1434] with allowance for the theoretical relationship between the pre-exponential factors of the k of the reactions of Br atoms with H_2 and D_2, the authors of [547] obtain the formula $k = 10^{14.43 \pm 0.14} \exp\left(-\frac{19{,}700 \pm 380}{RT}\right)$, which they consider to be most accurate. As is evident, the two formulas agree with the error limits. See also [666].

642. Recalculated on the basis of more exact thermochemical data. See also [1504a].

643. Calculated by the least-squares method on the basis of [69, 233]. The authors of [547] consider the formula $k = 10^{14.29\pm0.14} \exp\left(-\frac{21{,}400 \pm 380}{RT}\right)$ to be most accurate in satisfying the theory of the isotopic effect.

644. Calculated by the least-squares method on the basis of [233, 1712].

645. Obtained from the measured (in [403, 1466]) (averaged) k ratio of the given reaction and of the reaction $Br + CHF_3 = HBr + CF_3$, $10^{0.884\pm0.034} \exp \times \left(\frac{3{,}740 \pm 80}{RT}\right)$, and from the k of the latter [25], taken as standard.

646. This formula was obtained by the authors of [405] on the basis of the measured k ratio of the given reaction and of the reaction $Br + CHF_3 = HBr + CF_3$ and of the k of the latter reaction, $k = 10^{13.40} \exp\left(-\frac{23{,}600 \pm 700}{RT}\right)$. In subsequent papers [403 and 1466] they give $\lg A = 13.14_6$ instead of $\lg A = 13.34$.

647. Taken as standard is the k of the reaction $Br + CH_3Br = HBr + CH_2Br$, $k = 5.01 \times 10^{13} \exp\left(-\frac{15{,}850}{RT}\right)$.

648. This formula must obviously be considered as the most accurate; the authors of [547] note, however, that the real E may be lower, E = 18.18 (as a result of the fact that the E of the reaction of recombination of Br atoms is taken to be zero). See also [405].

649. These data are considered to be unreliable by the authors of [550].

650. On the basis of the k of the reaction $Br + CH_3Br = HBr + CH_2Br$, $k = 10^{13.73} \times \exp\left(-\frac{16{,}050}{RT}\right)$ [937].

651. Obtained from the measured k ratio of the reaction $Br + CH_4 = HBr + CH_3$ and of the given reaction and from the k of the first reaction [547].

652. Recalculated on the basis of the formulas $k = 10^{13.107\pm0.035} \exp \times \left(-\frac{22{,}320 \pm 110}{RT}\right)$ and $k = 10^{13.026\pm0.020} \exp\left(-\frac{19{,}310 \pm 60}{RT}\right)$ for the reaction $Br + CF_3H = HBr + CF_3$ and $Br + C_2F_5H = HBr + C_2F_5$, which were taken as standards.

653. Taken as standard was the k of the reaction Br + CH_3Br = HBr + CH_2Br, k = $10^{13.73} \exp\left(-\frac{16{,}050}{RT}\right)$ [937].

654. This formula must be considered as the most accurate. See, however, remark 648.

655. According to [581], the k ratio of the reactions Br + n-C_4H_{10} = HBr + $CH_3CHCH_2CH_3$ and Br + n-C_4H_{10} = HBr + $CH_2CH_2CH_2CH_3$ is 2/3(82 ± 15) at 400°.

656. The formula is estimative in nature and was selected so that the experimentally established characteristics of the relative reactivities in the reactions of splitting of hydrogen by the Br atom [Br + $CH_2XCH_2CH_2CH_3$(X = H,F,CF_3)] from various positions in the $CH_2XCH_2CH_2CH_3$ molecule would be satisfied.

657. From the data of [550], using the formula adopted in this reference for the k of the standard reaction Br + CH_3Br = HBr + CH_2Br, k = $10^{13.73} \exp\left(-\frac{16{,}050}{RT}\right)$, it follows that k = $10^{14.19\pm0.12} \exp\left(-\frac{10{,}225 \pm 234}{RT}\right)$, i.e., the formula agrees essentially with that given in [547]. The pre-exponential factor in the formula k = $10^{13.22} \exp\left(-\frac{10{,}225}{RT}\right)$, as given in [550], must be considered as erroneous.

658. Given with reference to [550].

659. According to [31], at 419° the k ratio of the reactions Br + n-C_4H_{10} = HBr + $CH_2(CH_2)_2CH_3(k_P)$ and Br + n-C_4H_{10} = HBr + $CH_3CHCH_2CH_3(k_S)$ is

$$\frac{k_S}{k_P} = 82 \pm 15$$

and the k ratio of the reactions Br + iso-C_4H_{10} = HBr + $CH_2(CH_3)_2CH(k_P)$ and Br + iso-C_4H_{10} = HBr + $(CH_3)_3C(k_T)$ is

$$\frac{k_T}{k_P} = 1{,}640 \pm 300.$$

660. According to [31], the k ratio of the reactions Br + iso-C_4H_{10} = HBr + $(CH_3)_3C$ and Br + iso-C_4H_{10} = HBr + $(CH_3)_2CHCH_2$ is 1,640 ± 300 at 419°.

661. Noting the contradiction between the thermal and photochemical data, Benson and Buss [147] believe that all the data are erroneous because of the failure

to take heterogeneous processes into account.

662. The pre-exponential factor, which exceeds the gas-kinetic factor by 3 to 4 orders, is apparently due to a chain. The formula proposed in [500] must be considered as incorrect.

663. See also [149, 800].

664. In [1384] 1.24×10^3 was obtained for the ratio of the k of the given reaction to the k of the reaction $Br + H_2 = HBr + H$.

665. The ratio of the k of the given reaction to the k of the reaction $Br + C_6H_5CH_2D = DBr + C_6H_5CH_2$ is $(1.08 \pm 0.25)\ \exp\left(\frac{1{,}430 \pm 110}{RT}\right)$.

666. See, however, [25].

667. Obtained on the basis of the measured k ratio of the given reaction and of the reaction $Br + CH_4 = HBr + CH_3$, $(0.56 \pm 0.03)\ \exp\left(\frac{2{,}480 \pm 40}{RT}\right)$, and the k of the latter reaction [547]. See also [403, 404].

668. Obtained on the basis of the measured k ratio of the given reaction and of the reaction $Br + CH_4 = HBr + CH_3$, $(0.24 \pm 0.01)\ \exp\left(\frac{2{,}000 \pm 40}{RT}\right)$, and the k of the latter reaction [547]. See also [403, 404].

669. Obtained on the basis of the measured k ratio of the reaction $Br + CH_4 = HBr + CH_3$ and of the given reaction, $(7.2 \pm 0.9)\ \exp\left(\frac{3{,}760 \pm 140}{RT}\right)$, and from the k of the first reaction [547]. See also [403, 404].

670. Calculated by the least-squares method on the basis of [405, 1466].

671. Obtained under the assumption that the E of recombination of Br atoms equals zero.

672. Bromine isotope.

673. Obtained on the basis of the measured k ratio of the reaction $Br + CH_4 = HBr + CH_3$ and of the given reaction and from the k of the first reaction [547]. See also [404].

674. Obtained on the basis of the accepted values of the k of the reactions $Br + n\text{-}C_4H_{10} = HBr + CH_2CH_2CH_2CH_3$ (1), $Br + n\text{-}C_4H_{10} = HBr + CH_3CHCH_2CH_3$ (2), $Br + CH_2FCH_2CH_2CH_3 = HBr + CH_2FCH_2CHCH_3$ (3), $Br + CF_3CH_2CH_2CH_3 = HBr + CF_3CH_2CH_2CHCH_3$ (4): $k_1 = 10^{13.1} \exp\left(-\frac{13,400}{RT}\right)$ and $k_2 = k_3 = k_4 = 10^{13.6} \exp\left(-\frac{10,200}{RT}\right)$ [550].

675. The relative k of the reactions of splitting of the H atom from the positions α, β, γ and δ ($\overset{\alpha}{C}H_2Cl\overset{\beta}{C}H_2\overset{\gamma}{C}H_2\overset{\delta}{C}H_3$) are 34, 32, 82 and 1.

676. The efficiencies of the various gases are also given in [772, 1327] (see also [1191]).

677. See, however, [1296].

678. According to [629], the ratio of the recombination constants of Br atoms for $M = Br_2$ and Ar is 130 at 300°, 110 at 350° and 90 at 400°.

679. Obtained using the recombination constant for $M = Br_2$; 5×10^{16} [357].

680. According to [236], the efficiency of Br_2 exceeds that of Ar by a factor no greater than 8.

681. Obtained using the data of [1218].

682. Obtained from the data of [232, 1442].

683. Obtained using the data of [1442].

684. Calculated by the least-squares method on the basis of [116, 233, 235, 236, 270, 629, 1297, 1301, 1442].

685. Calculated on the basis of [232, 1297, 1301, 1442].

686. See also [305].

687. In the investigated temperature range $Ar:Br_2:CO_2 = 1:100:4$.

688. Obtained using the data of [1218].

689. Calculated by the least-squares method on the basis of [116, 232, 233, 236,

305, 358].

690. The authors of [233] find that HBr is only slightly more efficient than argon.

691. Calculated on the basis of [232, 629, 1297, 1301].

692. The efficiency of $C(CH_3)_4$ is greater by a factor of 175 than that of H_2. See, however, [1054].

693. Mixture of H_2, Br_2 and HBr.

694. 0.6% Br_2 in Ar.

695. M corresponds to 2 to 5% Br_2 in oxygen.

696. M corresponds to 2 to 5% Br_2 in Ar.

697. M corresponds to 98% CO_2 and 2% Br_2.

698. M corresponds to 2% Br_2 + 98% N_2.

699. M corresponds to 5% Br_2 + 95% He.

700. M corresponds to 2% Br_2 + 98% CO.

701. Obtained by extrapolating the results relating to hot atoms.

702. Obtained on the basis of an analysis of the data of [117, 401].

703. Calculated by the least-squares method on the basis of [659, 799, 948, 1446, 1449].

704. See also [1207].

705. For the k ratio of the reactions $H + HI = H_2 + I$ and $H + I_2 = HI + I$ the author of [1449] obtains 0.070 ± 0.02 at 667° and 0.082 ± 0.012 at 800°, from which it follows that this ratio is independent of the temperature. The author also states that the E of the indicated reactions equal zero.

706. Obtained using the K measured in [634].

707. Given as the best formula obtained on the basis of Polanyi's rule for reactions of the given class. See also [547].

708. Calculated by the least-squares method on the basis of [562, 634, 656].

709. The measured k ratio of the reactions $I + C_2H_5 = HI + C_2H_4$ and $I + C_2H_5 \rightarrow C_2H_5I$ is 0.33 ± 0.03.

710. Obtained on the basis of the k of the reverse reaction and of calculation of the entropy factors. See also [154].

711. See, however, [634], where the typographic error in [562] is pointed out and the corrected formula $k = 10^{14.70} \exp\left(-\frac{34{,}100}{RT}\right)$ is given (taking the equilibrium constant measured in [634] into account). This formula yields values which are several orders lower than those obtained with the uncorrected formula.

712. Calculated by the least-squares method on the basis of [154, 213, 562, 1192].

713. Calculated by the least-squares method on the basis of [24, 486, 985]. The formula obtained from k_- and K must obviously be considered the most accurate [24].

714. Calculated by the least-squares method on the basis of [154, 734, 1192, 1448]. The formula $k = 10^{13.81\pm0.20} \exp\left(-\frac{16{,}900 \pm 500}{RT}\right)$, obtained as the average of the data of [734, 1192, 1448], must obviously be considered the most accurate.

715. Calculated from the data of [35] for an empty vessel using the equilibrium constant from [695].

716. The sum of the k of the given reaction and of the exchange reaction $I + C_2F_5I = C_2F_5I + I$ is $10^{13.0} \exp\left(\frac{13{,}500 \pm 800}{RT}\right)$.

717. Given in [547] with reference to [1192, 1448] is the formula $k = 10^{14.04} \times \exp\left(-\frac{E}{RT}\right)$, where E = 18,000-19,300.

718. The formula was obtained from the data of [440], notwithstanding the assertion of the authors that the measured rate constant is not the product

$k_1\sqrt{K_1}$, but k_5K, where k_1 is the k of the given reaction, $K_1 = \frac{(I)^2}{(I_2)}$,

$$K = \frac{(n\text{-}C_3H_7)(I_2)^{\frac{1}{2}}}{(n\text{-}C_3H_7I)}$$

and k_5 is the k of the reaction $n\text{-}C_3H_7 + I_2 = iso\text{-}C_3H_7I + I$. See, however, [1448].

719. Obtained on the basis of an estimate of the entropy.

720. Rate constant of the total reaction.

721. According to [142], racemization in one elementary step is extremely improbable.

722. In [142] this formula is given as being more probable, agreeing better with the experimental data than the formula $k = 10^{13.9} \exp\left(-\frac{14{,}400}{RT}\right)$, which in [1193] represents the k of Walden inversion.

723. Obtained using K.

724. This reaction was introduced into the mechanism of decomposition of alkyl iodides [142] in connection with a reinterpretation of the data of [1193].

725. In the presence of 8.83×10^{-6} moles cm^{-3} of CF_3I.

726. Obtained without allowing for recombination on iodine molecules.

727. The low rate of recombination of iodine atoms at very low contents of I_2 in inert gas (He, Ne, Ar, Kr, Xe), which is incompatible with the recombination constants measured under other conditions, is explained by Christie [353] as being due to the fact that the limiting process in this case is deactivation of the vibrationally excited iodine molecules formed during recombination.

728. See also [1252].

729. Calculated by the least-squares method on the basis of [237, 510, 1253].

730. According to [260, 1346], the relative efficiencies at 293° are Ar:He:Ne:Kr:Xe:H_2:N_2:O_2:CO_2:CH_4:C_3H_8:$n\text{-}C_5H_{12}$:cyclo-C_6H_{12}:C_2H_4:C_6H_6:CCl_4 = 1:0.47:0.50:1.2:1.6:1.3:1.2:1.8:3.7:2.4:8.4:13:15:4.7:2.4:14. See also [1253].

731. $k_{p,I_2}:k_{p,Ar} \simeq 30$ at 1,300° and $\simeq$ 250-600 at 300°. According to [259], the ratio $k_{p,I_2}:k_{p,Ar}$ decreases with increasing temperature, amounting to 600 at 300°.

732. Calculated by the least-squares method on the basis of [237, 259, 260, 355, 1253, 1442].

733. $k_{H_2}:k_{D_2} = 1.1$ at 326°.

734. According to [259], $k_{p,H_2}:(1.05 \pm 0.05) = k_{p,D_2}$ at 326°.

735. Relaxed nitrogen.

736. Unrelaxed nitrogen.

737. The authors consider the assumption of unrelaxed nitrogen to be more accurate.

738. Calculated by the least-squares method on the basis of [234, 237, 1346] (unrelaxed nitrogen).

739. Calculated by the least-squares method on the basis of [237, 1253].

740. The authors of [1194] consider the first of these formulas as more accurate.

741. The ratio of the k of the reaction $I + C_2H_5O = HI + CH_3CHO$ to the k of the reaction $I + C_2H_5O \rightarrow C_2H_5OI$ is $(2 \pm 1.5) \times 10^{-3}$.

742. See also [219].

743. Given in the article are the relative rates of H abstraction, and also of insertion by the CH_2 group, with respect to the C-H bond.

744. The ratio of the k of the given reaction to the k of the reaction $CH_2 + (CD_3)_3CH = CH_2D + CD_2(CD_3)_2CH$ is 0.61.

745. The ratio of the k of the reaction $CH_2 + C_3H_8 \rightarrow n\text{-}C_4H_{10}$ to the k of the given reaction is $1.8 \exp\left(\frac{70 \pm 10}{RT}\right)$.

746. The ratio of the k of the reaction $CH_2 + n\text{-}C_4H_{10} \rightarrow n\text{-}C_5H_{12}$ to the k of the given reaction is $0.7 \exp\left(\frac{260 \pm 30}{RT}\right)$.

747. See also [769, 1321].

748. The ratio of the k of the reaction CH_2 + iso-C_4H_{10} $\rightarrow$ iso-C_5H_{12} to the k of the given reaction is 1.3 $\exp\left(\frac{190 \pm 20}{RT}\right)$.

749. The ratio of the k of the reaction CH_2 + n-C_5H_{12} $\rightarrow$ n-C_6H_{14} to the k of the given reaction is 0.7 $\exp\left(\frac{200 \pm 50}{RT}\right)$.

750. The ratio of the k of the reaction CH_2 + n-C_5H_{12} $\rightarrow$ n-C_6H_{14} to the k of the given reaction is 1.3 $\exp\left(\frac{350 \pm 50}{RT}\right)$.

751. Given are the relative reactivities of the double bonds: C_2H_4:C_2H_3F:$C_2H_2F_2$:C_2HF_3:C_2F_4 = 1.0:0.60:0.33:0.16:0.10.

752. The ratio of the k of the given reaction to the k of the reaction CH_2 + iso-C_4H_8 $\rightarrow$ C_5H_{10} is 0.35 ± 0.1.

753. See also [593, p. 150] and [1295].

754. Given are the relative rates of addition and formation with respect to various bonds.

755. The ratio of the k of the given reaction to the k of the reaction CH_2 + iso-C_4H_8 $\rightarrow$ C_5H_{10} is 6.64 ± 0.14.

756. See also [592, 593, p. 150].

757. The ratio of the k of the given reaction to the k of the reaction CH_2 + iso-C_4H_8 $\rightarrow$ C_5H_{10} is 0.35 ± 0.03.

758. See also [273, 274; 593, p. 150].

759. The ratio of the k of the given reaction to the k of the reaction CH_2 + iso-C_4H_8 $\rightarrow$ C_5H_{10} is 0.56 ± 0.02.

760. See also [273, 274, 589; 593, p. 150].

761. The ratio of the k of the given reaction to the k of the reaction CH_2 + iso-C_4H_8 $\rightarrow$ C_5H_{10} is 0.33 ± 0.04.

762. The ratio of the k of the given reaction to the k of the reaction CH_2 + iso-$C_4H_8 \rightarrow C_5H_{10}$ is 0.31 ± 0.02.

763. See also [590; 593, p. 150].

764. The ratio of the k of the given reaction to the k of the reaction CH_2 + iso-$C_4H_8 \rightarrow C_5H_{10}$ is 0.64 ± 0.03.

765. The ratio of the k of the given reaction to the k of the reaction CH_2 + iso-$C_4H_8 \rightarrow C_5H_{10}$ is 0.96 ± 0.05.

766. The difference in E of the reactions $CH_2 + CH_2F_2 = C_2H_3F + HF$ and $CH_2 + CH_2F_2 \rightarrow C_2H_4F_2$ is 2.7.

767. The ratio of the k of the given reaction to the total k of the reaction of CH_2 with C_2H_5Cl is less than 0.14.

768. The rate constant of $2CH_3 \rightarrow C_2H_6$ is taken to be $k = 10^{13.34}$ [1401].

769. See also [413].

770. See also [1597].

771. The activation energy of $2CH_3 \rightarrow C_2H_6$ is taken to be zero.

772. See also [1523].

773. Given with reference to [1235, 1597].

774. It was shown in [1610] that the value of E = 13.2 ± 1.0 must be corrected to 10.5 ± 1.0.

775. Given in [733] are the following values of E: 5.5; 6.5; 6.0; 6.5; 8.2; 6.2; 7.2.

776. The difference in E of the given reaction and of the reaction $CH_3 + CH_3COCH_3 = CH_4 + CH_2COCH_3$ is 2.3.

777. Obtained assuming that the steric factor is 0.1. See also [1142].

778. The k ratio of the reactions of CH_3 with D_2 and with $C_6H_4(CH_3)_2$ is 6.4. According to [271], this ratio is 5.3 at 700°.

779. According to [1610], the figure 14.3 must be corrected to 12.2 ± 1.0.

780. Calculated by the least-squares method on the basis of [1039, 1040, 1041, 1310, 1597].

781. Given in [1764] is E = 33 ± 1.5 and, from an estimate of the thermal effect of the reaction, 27 ± 3.

782. The reaction was chosen in preference. The author obtains 1:278 for the ratio of the k of this reaction to the k of the reaction $CH_3 + I_2 = CH_3I + I$.

783. See also [94].

784. The scheme of the reaction was given preference. The formula was obtained from the measured ratio of the k of the given reaction to the k of the reaction of CH_3 with acetone, using the recommended k of the latter reaction.

785. The k ratio of the reactions $CH_3 + HBr = CH_4 + Br$ and $CH_3 + Br_2 = CH_3Br + Br$ is $10^{1.96} \exp\left(-\frac{1{,}520}{RT}\right)$. The formula given in the table was obtained on the basis of the recommended formula for the k of the reaction of CH_3 with HBr.

786. The ratio of the k of the given reaction to the k of the reaction $CH_3 + HBr = CH_4 + Br$ is 5. The given value of k was obtained on the basis of the recommended k of the latter reaction.

787. The ratio of the k of the given reaction to the k of the reaction $CH_3 + O_2 = CH_3O_2$ is 820. According to the data of [119], the latter reaction is second order.

788. The ratio of the k of the reactions $CH_3 + I_2 = CH_3I + I$ and $CH_3 + HI = CH_4 + I$ is $4.4 \exp\left(\frac{750}{RT}\right)$.

789. Obtained as the mean of the data of [562, 1192, 1448].

790. Calculated from the k of the reverse reaction [949], which was obtained on the basis of the k of the reaction $Cl + H_2 = HCl + H$, $k = 8.0 \times 10^{13} \exp \times$

$\left(- \frac{5,500}{RT}\right)$ [43, 44].

791. See also [1466].

792. Page 188. Calculated from the k of the reverse reaction [1276] and from K.

793. The authors of [1275] point out that the low value of E in [1425] must evidently be explained by the fact that, as is well known [1180], the values of E are usually low when studying reactions of CH_3 obtained by photolysis of acetone at low temperatures.

794. See also [1524, p. 199].

795. The ratio of the k of the reaction $CH_3 + I_2 = CH_3I + I$ to the k of the given reaction is 28.7 $\exp\left(\frac{2,400}{RT}\right)$. The authors find that hot CH_3 radicals play a part in the latter ($CH_3 + HCl = CH_4 + Cl$).

796. Obtained by averaging the parameters of the formulas cited in [499, 1275, 1524].

797. See also [147].

798. Measured was the ratio of the k of the reaction $CH_3 + HBr = CH_4 + Br$ to the k of $CH_3 + I_2 = CH_3I + I$, which was 0.064, on the average. The difference in E of these reactions, 0.8 ± 0.3, was obtained under the assumption of equality between the ratio of the steric factors of these reactions and that of the reactions $H + HBr = H_2 + Br$ and $H + Br_2 = HBr + Br$; the given value of E of the reaction $CH_3 + HBr = CH_4 + Br$ was obtained on the basis of the E of $CH_3 + I_2 = CH_3I + I$, which was taken to be 0.5 ± 0.5.

799. Obtained assuming that the E of the reaction $CH_3 + I_2 = CH_3I + I$ is zero. Obtained for the logarithm of the k ratio of the reaction $CH_3 + HBr = CH_4 + Br$ and of this reaction was $-0.3 \pm 0.13 - \frac{1,370 \pm 260}{4.575\ T}$.

800. Obtained using the k of the reaction $CH_3 + I_2 = CH_3I + I$, $k = 10^{12.9} \exp\left(- \frac{800 \pm 400}{RT}\right)$ [562, 1192, 1448].

801. Obtained assuming that the E of the reaction $CH_3 + I_2 = CH_3I + I$ is zero. Obtained for the logarithm of the k ratio of the reaction $CH_3 + HBr =$

CH_4 + Br and of this reaction was $-0.125 - \frac{950}{4.575\ T}$.

802. Obtained from [551, 1617]. See remark 800.

803. Obtained from the measured k ratio of the reactions $CH_3 + I_2 = CH_3I + I$ and $CH_3 + HI = CH_4 + I$ and from the k of the first of these reactions, calculated from the k of the reverse reaction and from K.

804. According to [154], the k ratio of the reactions of CH_3 with HI and I_2 at 553° is 0.15. The given figure was obtained on the basis of the recommended k of the reaction of CH_3 with I_2.

805. The formula was obtained from the recommended k of the reverse process and from the equilibrium constant, which can be represented by the formula

$$K = \frac{p_{OH}p_{CH_4}}{p_{H_2O}p_{CH_3}} = 0.16\ \exp\left(-\frac{16{,}777}{RT}\right)$$

in the temperature range 1,000 to 2,000° with an error not exceeding 3.5%.

806. In [816a] 4.0 ± 0.3 was obtained for the difference in E of the reaction $CH_3 + CH_3CHO = CH_4 + CH_3CO$ and of the given reaction. The value of E of the first reaction, 6.8, was used in calculating E [55].

807. We will have $E = 3.49 \pm 0.56$ if we use the recommended value for the E of the reaction $CH_3 + CH_3CHO = CH_4 + CH_3CO$.

808. See also [680].

809. Obtained from the ratio of the k of the given reaction to the k of the reaction $CH_3 + CH_3CHO = CH_4 + CH_3CO$ using the k recommended for the latter.

810. Calculated by averaging the parameters of the formulas obtained on the basis of [673, 1529].

811. The rate constant of the reaction $CH_3 + NO \rightarrow CH_3NO$ was taken to be 10^{12}.

812. The reaction mechanism was not established exactly.

813. Calculated from the graph.

814. Used was the k of the reaction $CH_3 + CH_3COCH_3 = CH_4 + CH_2COCH_3$, $k = 10^{11.59} \times \exp\left(-\frac{9{,}870}{RT}\right)$ [1737].

815. $\Delta = 0.036 \pm 0.003$.

816. $\Delta = 0.06$. See [78, 749].

817. Obtained from the measured value, $\Delta = 0.055$, and from the recombination k of $CH_3 + C_2H_5 = C_3H_8$ ($k = 10^{14}$).

818. The measured ratios of the pre-exponential factors and the difference in E of the reactions $CH_3 + CH_3COCH_3 = CH_4 + CH_2COCH_3$ and $CH_3 + C_2D_6 = CH_3D + C_2H_5$ are 0.20 and -5.23 ± 0.16. Taking the E of the first of these reactions to be 9.6 ± 0.1, the authors obtain $E = 14.8 \pm 0.3$ for the second reaction. The difference in E of these reactions -2.0, obtained in [1315a], is considered by the authors of [1088] to be erroneous because of the small temperature interval (50°).

819. $\Delta = 0.058 \pm 0.004$.

820. The recombination constants of all the radicals were taken to be 10^{14}.

821. $\Delta = 0.165 \pm 0.005$.

822. $\Delta = 0.216 \pm 0.032$.

823. $\Delta = 0.30$.

824. $\Delta = 0.08$.

825. $\Delta = 0.85 \pm 0.1$.

826. $\Delta = 0.70 \pm 0.04$.

827. See also [922].

828. Measured was the difference in E (0.64) of the given reaction and of the reaction $CH_3 + Hg(CH_3)_2 = CH_4 + CH_2HgCH_3$; from this, on the basis of the E of the latter reaction, namely 9 [642], the authors find the given value.

829. The k ratio of the reaction of CH_3 with butane and of $CH_3 + Hg(CH_3)_2 = CH_4 + \ldots$ is $10^{0.27} \exp\left(\frac{650}{RT}\right)$.

830. Calculated by the least-squares method on the basis of [640, 866, 1307, 1525].

831. Calculated by the least-squares method on the basis of [158, 182, 866, 1307, 1525].

832. Calculated by the least-squares method on the basis of [158, 182, 1525].

833. Calculated by the least-squares method on the basis of [1307, 1525, 1526, 1530].

834. According to the data given in [1530], lg A = 9.93.

835. According to the data given in [1530], lg A = 9.17.

836. Obtained on the basis of [1307, 1525].

837. The rate constant of $2CD_3 \rightarrow C_2D_6$ was taken to be $10^{13.58}$ [1401].

838. Recalculated from the data of [1525].

839. Obtained from the measured k ratio of the given reaction and of the reaction $CH_3 + \text{iso-}C_4H_{10} = CH_4 + C_4H_9$ and from $k = 6.8 \times 10^{10} \exp\left(-\frac{7,600}{RT}\right)$ [1525] for a recombination k for methyl radicals of 2.2×10^{13} [140].

840. Using the recommended formula for $CH_3 + \text{iso-}C_4H_{10} = CH_4 + C_4H_9$ we get $k = 10^{10.07} \exp\left(-\frac{7,020}{RT}\right)$.

841. It was pointed out in [1426] that the method used in [1474] to determine E is erroneous.

842. Calculated by the least-squares method on the basis of [422, 1127, 1528].

843. Using the recommended formula for $CH_3 + \text{iso-}C_4H_{10} = CH_4 + C_4H_9$ we get $k = 10^{10.72} \exp\left(-\frac{7,120}{RT}\right)$.

844. Using the recommended formula for $CH_3 + \text{iso-}C_4H_{10} = CH_4 + C_4H_9$ we get $k = 10^{10.81} \exp\left(-\frac{7,720}{RT}\right)$.

845. Using the recommended formula for $CH_3 + iso\text{-}C_4H_{10} = CH_4 + C_4H_9$ we get $k = 10^{10.88} \exp\left(-\frac{7,420}{RT}\right)$.

846. Using the recommended formula for $CH_3 + iso\text{-}C_4H_{10} = CH_4 + C_4H_9$ we get $k = 10^{11.13} \exp\left(-\frac{8,020}{RT}\right)$.

847. Used here was the E of the reaction $CD_3 + CD_3COCD_3 = CD_4 + CD_2COCD_3$, E = 11.5.

848. Calculated by the least-squares method on the basis of [1237, 1529].

849. Calculated by the least-squares method on the basis of [962, 1161, 1529].

850. Calculated by the least-squares method on the basis of [266, 910, 1161, 1307].

851. See [1224].

852. The activation energy of the reaction $CH_3 + CH_3O \rightarrow CH_3OCH_3$ was taken to be zero. At 29°C the k ratio of the reactions $CH_3 + CH_3O = CH_4 + CH_2O$ and $CH_3 + CH_3O \rightarrow CH_3OCH_3$ is 1.2 and 2.6 at 142°C.

853. $k = 10^{13.34}$ was chosen for $2CH_3 \rightarrow C_2H_6$ and $k = 10^{13.2}$ for $CH_3O + CH_3 \rightarrow CH_3OCH_3$.

854. Calculated on the basis of $\varphi = 2$ and of the k of the reactions $2CH_3 \rightarrow C_2H_6$ (1) and $2CH_3O \rightarrow (CH_3O)_2$ (2), $k_1 = 10^{13.34}$ [1401] and $k_2 = 10^{13.0}$. The quantity k_2 was obtained from the measured k of the reverse reaction [715, 1465] and from the entropy factors [158].

855. $\Delta = 1.51 \pm 0.2$; $\Delta = 1.2$ and 2.6 is given in [669] with reference to [1431].

856. $\Delta \cong 1.4$ in the entire temperature interval, which leads the author to conclude that the E of the disproportionation reaction is 0.

857. The ratio of the k of the given reaction to the k of the reaction of H abstraction from OH is 0.66.

858. Obtained under the assumption that the k of the reactions $CH_3 + CH_3OH = CH_4 + CH_3O$ and $CH_3 + CD_3OH = CH_4 + CD_3O$ are equal to each other.

859. Calculated by the least-squares method on the basis of [1237, 1529].

860. The ratio of the k of the given reaction to the k of the reaction of H abstraction from OH is 2.7.

861. The ratio of the k of the given reaction to the k of the reaction of H abstraction from OH is 0.34.

862. According to [660a], E $\cong$ 11.

863. The rate constant of recombination of CH_3 and CH_3OCH_2 is taken to be 2.2×10^{13}.

864. Calculated by the least-squares method on the basis of [1027, 1529].

865. In the indicated temperature interval the k ratio of the reactions $CH_3 + (CH_2)_2O = CH_4 + C_2H_3O$ and $CH_3 + Hg(CH_3)_2 = CH_4 + CH_2HgCH_3$ is 0.343. Since this ratio is constant, the E of the two reactions are probably constant.

866. Calculated by the least-squares method on the basis of [641, 1237].

867. The rate constant of $CH_3 + CH_3O \rightarrow CH_3OCH_3$ is taken to be 1.6×10^{13} [158].

868. Obtained on the basis of the measured k ratio, assuming that the k of the reactions $2CH_3 \rightarrow C_2H_6$ and $2HCO = H_2 + 2CO$ are $10^{13.34}$.

869. On the basis of the data of [55, 168, 475, 912].

870. Obtained from the measured ratio of the k of the given reaction to the square root of the k of CH_3 recombination, which is equal to $k_p = 2.1 \times 10^{12}\sqrt{T}$, according to [641].

871. Estimate from the CO yield.

872. Calculated by the least-squares method on the basis of [55, 168, 230, 231, 977].

873. In the opinion of the authors of [1021], the curvature of the Arrhenius line plotted from the data of [55, 168, 475, 912, 1021, 1555] is possibly due to the tunnel effect.

874. Actually, according to [1021], the given reaction takes place according to the scheme

$$CH_3 + CH_3CHO = (CH_3)_2\underset{\displaystyle O}{\underset{|}{CH}} \qquad (11)$$

$$(CH_3)_2\underset{\displaystyle O}{\underset{|}{CH}} \rightarrow (CH_3)_2CO + H \qquad (12)$$

and k is expressed by the formula $k = \dfrac{k_{11}k_{12}}{k_{-11} + k_{12}}$.

875. Given with reference to [921].

876. See also [169, 1111].

877. In the experiments of [484], the pressure of the acetone exceeded 100 mm Hg.

878. Obtained from the measured ratio of the k of the given reaction to the square root of the k of CH_3 recombination with $p \rightarrow \infty$; $k = (2.00 \pm 0.15)\ 10^{12}\sqrt{T}$.

879. The rate constant of $2CH_3 \rightarrow C_2H_6$ is taken to be $2.1 \times 10^{12}\sqrt{T}$ [1737].

880. The rate constant of $2CH_3 \rightarrow C_2H_6$ is taken to be 4.5×10^{13} [641].

881. Obtained on the basis of the data of various authors. The data were recalculated taking into account the dependence of the k of the reaction $2\ CH_3 \rightarrow C_2H_6$ on T and p. See also [427].

882. The difference in E of the reactions of CH_3 with $(CD_3)_2CO$ and with $(CH_3)_2CO$ is 1.67 ± 0.09 and the ratio of the steric factors is 1.305 ± 0.085. The formula recommended for the k of the second reaction was used.

883. Calculated by the least-squares method on the basis of [53, 1273].

884. Given with reference to the private communication of Kutschke.

885. The activation energy is 1.1 if the E of the reaction $CH_3 + CF_3 \rightarrow CH_3CF_3$ is zero.

886. $\varphi = (2.0 \pm 0.2)\ \exp\left(\dfrac{170 \pm 80}{RT}\right)$. See also [1264].

887. See also [671].

888. Obtained from the k ratio of the given reaction and of the reaction CH + I = CH I + I and from the k of the latter, calculated from the k of the reverse reaction and from K.

889. Calculated from the k ratio given in [1448] for the given reaction and the reaction CH_3 + HBr = CH_4 + Br and from the k recommended for the latter.

890. Calculated by the least-squares method on the basis of [671, 1529]. The mean lg A and E yield the formula $k = 10^{11.07\pm0.08} \exp\left(-\frac{8{,}550 \pm 150}{RT}\right)$.

891. The given constant is not a constant of one elementary reaction.

892. Calculated by the least-squares method on the basis of [227, 671].

893. Calculated by the least-squares method on the basis of [959, 1529].

894. Given in the same reference is the formula $k = 10^{11.0} \exp\left(-\frac{7{,}800}{RT}\right)$.

895. In [227] the incorrect calculation of the Arrhenius curve is indicated as the reason for the low value of E obtained in [959].

896. Obtained from the k of the total reaction and of the reaction with $ND_2CH_2CH_2ND_2$ assuming the absence of a secondary isotope effect.

897. Obtained from the k ratio of the reactions CH_3 + $NH_2CH_2CH_2NH_2$ = CH_4 + $NH_2CHCH_2NH_2$ and CH_4 + $NHCH_2CH_2NH_2$.

898. Calculated by the least-squares method on the basis of [227, 229, 664].

899. The previously obtained values of E = 7.6-8.4 are considered by the authors of [661] and [1509] to be incorrect, because the reaction $CH_3N_2CH_3$ + $h\nu$ = C_2H_6 + N_2 was not taken into account when determining them.

900. The corrections applied by the authors of [1509] to the data of [865] take into account the part played by direct formation of ethane in the photolysis of $(CH_3N)_2$. In the opinion of the authors of [1509], the data of [53, 673, 1508] are also subject to correction.

901. In the opinion of the authors of [1509], the low value obtained for E in [1507] is explained by the fact that the reaction takes place partially at

the wall under the experimental conditions.

902. Calculated by the least-squares method on the basis of [644, 661, 664, 667, 671, 681, 865, 1277, 1498, 1508, 1509].

903. $\Delta \cong 0.04$.

904. The difference in E of the reaction of CH_3 with $(CH_3)_2O$ and of the given reaction is 2-3. The cited figure is given using the E recommended for the latter reaction.

905. Calculated by the least-squares method on the basis of [641, 797, 1308].

906. The k ratio of the reactions $CH_3 + Hg(CH_3)_2 = C_2H_6 + \ldots$ and $CH_3 + Hg(CH_3)_2 = CH_4 + \ldots$ is $10^{4.75} \exp\left(\frac{8,500}{RT}\right)$. The formula was obtained using the formula recommended for the k of the latter reaction.

907. The formula recommended for the reaction $CH_3 + Hg(CH_3)_2 = CH_4 + CH_2HgCH_3$ was used.

908. Obtained with a number of assumptions.

909. $M = (CH_3)_2N_2 + {\sim}3CO$.

910. The neopentane pressure is 150-280 mm Hg.

911. The rate constant of the reaction $2CH_3 \rightarrow C_2H_6$ at 200°C is taken to be $10^{14.40}$.

912. Obtained using the data of [493].

913. $M = 3\%\ CH_3I + 97\%\ CO_2$.

914. See [12].

915. Calculated from the measured ratio of the k of the reaction $CH_3 + I_2 = CH_3I + I$ to the k of the given reaction, 6, under certain assumptions as to the relationship between the pre-exponential factors of the k of these reactions.

916. See also [1053].

917. Obtained at pressures of about 0.2 mm Hg.

918. See also [578; 1524, p. 122].

919. $p = p_{He}$ = 10 mm Hg. Not excluded is the possibility of an intermediate pressure region.

920. The reaction is second order at an acetaldehyde or neopentane pressure greater than 100 mm Hg.

921. According to [787], the efficiency of CO_2 is lower than that of acetone by a factor of 10.

922. See also [1081].

923. The k ratio of the reactions $CH_3 + O_2 + CH_3I = CH_3O_2 + CH_3I$ and $CH_3 + I_2 = CH_3I + I$ is 5.4×10^3 (293°).

924. The acetone pressure is less than or equal to 200 mm Hg. Given in [351, 352] is $k = 10^{16.3}$. The efficiency of CO_2 is lower by a factor of about 10.

925. Mean value. The authors note a slight decrease in k with increasing temperature.

926. M is a mixture of $(CH_3)_4C$, $CH_3N_2CH_3$ and O_2.

927. See also [1081], where the ratio of the k of the given reaction to the k of the reaction $CH_3 + O_2 = HCHO + OH$, 1.12×10^5 at 250°C and 7.08×10^5 at 200°C, is given.

928. $10^{2.53} \exp\left(\frac{18,000}{RT}\right)$ was obtained for the k ratio of the reactions $CH_3 + O_2 + M = CH_3O_2 + M$ and $CH_3 + O_2 = HCHO + OH$.

929. From the data of [119] the authors find 820 for the ratio of the k of the reaction $CH_3 + I_2 = CH_3I + I$ to the k of the given reaction.

930. Obtained from the k ratio of the reactions $CH_3 + O_2 \rightarrow CH_3O_2$ and $CH_3 + CH_3NNCH_3 = CH_4 + CH_2NNCH_3$, 6.8×10^4 (123°C) and 3.3×10^4 (161°C), and

from the E of the second reaction (7.3).

931. Obtained from the data of a large number of authors.

932. Calculated from the data of [477, 935, 1401].

933. The ratio of the k of the given reaction to the k of recombination is 0.27 ± 0.07.

934. Obtained on the basis of the data of [477, 935, 1401]. Given in [1737] are the efficiencies of various gases relative to CH_3COCH_3.

935. $p = 75$ mm Hg.

936. $p_{He} = 8$ mm Hg.

937. $p = 50$ mm Hg.

938. $p = 30$ mm Hg.

939. $p = 5$ to 100 mm Hg.

940. $p = 10$ mm Hg.

941. $\varphi = \frac{k_4}{\sqrt{k_3 k_5}} = 1.9 \pm 0.1$, where k_3, k_4 and k_5 are the k of the reactions $2CH_3 \rightarrow C_2H_6$, $CH_3 + CD_3 \rightarrow CH_3CD_3$ and $2CD_3 \rightarrow C_2D_6$.

942. Calculated by the least-squares method on the basis of [509, 1044].

943. See also [1524, p. 303].

944. The ratio of pre-exponential factors and the difference in E of the given reaction and of the reaction CH_3 + isooctane = $CH_4 + C_8H_{17}$ are, respectively, 8.6 and -1.03.

945. Calculated by the least-squares method on the basis of [226, 422, 792].

946. Calculated by the least-squares method on the basis of [226, 422, 792] using the formula recommended for the reaction CH_3 + iso-C_4H_{10} = $CH_4 + C_4H_9$.

947. $\varphi \cong 1.8$.

948. $\Delta = 0.04 \pm 0.02$.

949. $\varphi = 1.9$.

950. The data of [1403] were used.

951. See also [1495].

952. The ratio of pre-exponential factors and the difference in E of the given reaction and of the reaction CH_3 + isooctane = $CH_4 + C_8H_{17}$ are, respectively, 5.55 and -1.00.

953. See also [1524, p. 303].

954. Calculated by the least-squares method on the basis of [422, 1044, 1127].

955. The rate constant of the reaction $n\text{-}C_4H_9\text{-}2 \rightarrow C_8H_{18}$ was taken to be 10^{14} and of the reaction $2CH_3 \rightarrow C_2H_6$, $10^{13.36}$ [1401].

956. Obtained using the recommended formula for the reaction CH_3 + iso-C_4H_{10} = $CH_4 + C_4H_9$.

957. $\varphi = 2.1$.

958. The ratio of pre-exponential factors and the difference in E of the given reaction and of the reaction CH_3 + isooctane = $CH_4 + C_8H_{17}$ are 5.8 and -1.29, respectively.

959. The ratio of pre-exponential factors and the difference in E of the given reaction and of the reaction CH_3 + isooctane = $CH_4 + C_8H_{17}$ are 12.6 and -3.38, respectively.

960. The ratio of pre-exponential factors and the difference in E of the given reaction and of the reaction CH_3 + isooctane = $CH_4 + C_8H_{17}$ are 12.6 and -3.38, respectively.

961. See also [487].

962. The ratio of pre-exponential factors and the difference in E of the given reaction and of the reaction CH_3 + isooctane = $CH_4 + C_8H_{17}$ are 7.6 and -3.22, respectively.

963. The ratio of pre-exponential factors and the difference in E of the given reaction and of the reaction CH_3 + isooctane = $CH_4 + C_8H_{17}$ are 5.7 and -3.36, respectively.

964. $\Delta = 1.25$.

965. The rate constant of the reaction $CH_3 + CH_3O = CH_4 + HCHO$ was taken to be $10^{13.38}$.

966. Obtained from the measured ratio of constants under the assumption that the k of the reaction $CH_3 + HCO = CH_4 + CO$ is $10^{13.34}$.

967. $\varphi = 0.10$.

968. $\Delta = 0.06$.

969. $\varphi = 1.65 \pm 0.15$.

970. Obtained was the mean value of the quantity

$$\frac{1}{\varphi} = \frac{\sqrt{k_2k_5}}{k_4} = 0.7 \pm 0.3,$$

where k_2, k_5 and k_4 refer to the reactions $2CH_3 \rightarrow C_2H_6$ (k_2), $2CH_2COCH_3 \rightarrow (CH_2COCH_3)_2$ (k_5) and $CH_3 + CH_2COCH_3 \rightarrow C_2H_5COCH_3$ (k_4).

971. For the quantity

$$\frac{k_1}{\sqrt{k_2k_3}},$$

where k_1, k_2 and k_3 are the k of the reactions $CH_3 + CF_3 \rightarrow CH_3CF_3$, $CH_3 + CH_3 \rightarrow C_2H_6$ and $CF_3 + CF_3 \rightarrow C_2F_6$, the authors obtain $(2.0 \pm 0.2)\exp\left(\frac{170 \pm 80}{RT}\right)$, whence they conclude that $E_1 = E_2 = E_3 \simeq 0$.

972. The following relations were obtained: $E_1 - \frac{1}{2}E_2 - \frac{1}{2}E_3 = -1.07 \pm 0.1$ and

$$\frac{A_1}{\sqrt{A_2A_3}} = 0.52 \pm 0.06,$$

where E and the pre-exponential factors are those of the reactions $CH_3 + CF_3 \rightarrow CH_3CF_3$ (1), $2CH_3 \rightarrow C_2H_6$ (2) and $2CF_3 \rightarrow C_2F_6$ (3).

973. $\varphi = 2 \pm 1$.

974. Measured was the k ratio of the reactions $CH_3 + CH_3N_2CH_3 \rightarrow (CH_3)_2N_2CH_3$ and $CH_3 + CH_3N_2CH_3 = CH_4 + CH_2N_2CH_3$; 4.0 (123°C) and 5.5 (161°C).

975. Calculated by the least-squares method on the basis of [644, 791, 865, 912].

976. Obtained by a different method in the same paper was the formula $k = 10^{11.78} \exp\left(-\frac{10{,}100}{RT}\right)$.

977. Calculated by the least-squares method on the basis of [755, 1039, 1041, 1597].

978. Obtained on the basis of the measured ratio of the k of the given reaction and of the reaction $CD_3 + CD_3COCD_3 = CD_4 + CD_2COCD_3$ using the recommended formula for the latter.

979. The rate constant was obtained using the recommended formula for the k of the reaction $CD_3 + (CD_3)_2CO = CD_4 + CD_2COCD_3$, taken as standard.

980. See also [428, 429].

981. Obtained using the mean value of the quantity $k_1 : \sqrt{k_2}$ ($CD_3 + CD_3COCD_3 = CD_4 + CD_2COCD_3$, k_1: $2CD_3 = C_2D_6$, k_2) from the measurements of other authors [428] and from the value $k_2 = 10^{13.58}$ [1401].

982. The rate constant for recombination of CD_3 radicals was chosen as $10^{13.7}$.

983. Calculated by the least-squares method on the basis of [650, 1088, 1525, 1600].

984. The rate constant was obtained using the k of the reaction $CD_3 + CD_3COCD_3 = CD_4 + CD_2COCD_3$, $k = 3.5 \times 10^{10}\sqrt{T} \exp\left(-\frac{11{,}100}{RT}\right)$, which was considered as standard [1085, 1086].

985. The data of [1084] were used.

986. The recommended formula for the k of the reaction $CD_3 + C_2H_6 = CHD_3 + C_2H_5$ was used.

987. See also [671, 824].

988. The mean value of Δ is 0.051.

989. See also [660a].

990. Obtained under the assumption that abstraction of primary H does not depend on the mass of the hydrogen atom in the secondary position.

991. Given with reference to [1089].

992. $\Delta = 0.31$.

993. Calculated by the least-squares method on the basis of [647, 650, 1090].

994. See also [1269, 1307].

995. $\Delta \cong 1.8$.

996. Obtained assuming the equality of the k of $CD_3 + CD_3OH = CD_3H + CD_3O$ and $CD_3 + CH_3OH = CD_3H + CH_3O$.

997. In view of the smallness of the secondary isotope effect [47, 1084] the k of this reaction was considered equal to the k of the reaction $CD_3 + CD_3OH = CD_3H + CD_3O$.

998. Not indicated is the value chosen for the k of CD_3 recombination.

999. Obtained using the k of the reaction $CD_3 + (CH_3)_2CO = CHD_3 + CH_2COCH_3$ given in this table.

1000. The authors consider the value of the pre-exponential factor to be insufficiently reliable because the concentration of CD_3COCHD_2 was not accurately known.

1001. Calculated from the measured difference in E of the reactions of CD_3 with $(CD_3)_2CO$ and $(CH_3)_2CO$ and from the equality of the E of the reactions of CD_3 and CH_3 with $(CH_3)_2CO$, which was established in [1086]. The E recommended for the latter reaction was used.

1002. The authors point out that the E is too low in [1041] because of the curvature of the Arrhenius plot.

1003. Given with reference to [1086, 1527].

1004. The rate constant of the reaction $2CD_3 = C_2D_6$ is taken to be independent of the temperature and is 3.8×10^{13} [1401].

1005. Obtained on the basis of a number of assumptions and from the E of the reaction $CH_3 + CH_3COCH_3 = CH_4 + CH_2COCH_3$, which is taken to be 9.6.

1006. Calculated by the least-squares method on the basis of [181, 409, 428, 660a, 680, 1039, 1041, 1398, 1527, 1597].

1007. $\varphi = 0.38$ at 150°C and 0.6 at 30°C.

1008.

$$\varphi = \frac{k_{12}}{\sqrt{k_8 k_{14}}} = 1.99,$$

where k_8, k_{12}, k_{14} are the k of the reactions $2CD_3CO \rightarrow (CD_3CO)_2$, $CD_3 + CD_3CO \rightarrow CD_3COCD_3$ and $2CD_3 \rightarrow C_2D_6$. According to [1602], $\varphi = 1.65$, and according to [297], 2.2.

1009. The authors of [1059] believe this figure to be more accurate than the one they obtained earlier [1058].

1010. Estimate based on the E of the reaction $C_2H_5 + D_2 = C_2H_5D + D$ and on the difference in zero point energy.

1011. See also [873, 1136].

1012. Obtained from the measured ratio of the k of the given reaction to the square root of the k of the reaction $2C_2H_5 \rightarrow C_4H_{10}$, which is taken to be $10^{13.34}$ $(9.1_2 \pm 1.2) \times 10^5 \exp\left(\frac{13,730 \pm 260}{RT}\right)$.

1013. Obtained from the measured k ratio of the reactions $C_2H_5CHCH_2 \rightarrow CH_3 + C_3H_5$ (1.9×10^{-4} sec^{-1}) and $2C_2H_5 = C_2H_6 + C_2H_4$ and C_4H_{10} [922].

1014. On the basis of [712, 994].

1015. Measured was the ratio of the k of the given reaction to the k of the reaction $C_2H_5 + C_2H_5COC_2H_5 = C_2H_6 + C_2H_4COC_2H_5$. The rate constant was obtained on the basis of the k of the reaction $C_2H_5 + C_2H_5COC_2H_5 = C_2H_6 + C_2H_4COC_2H_5$ [976].

1016. The k ratio of the reactions $C_2H_5 + HBr = C_2H_6 + Br$ and $C_2H_5 + Br_2 = C_2H_5Br + Br$ is 0.66.

1017. See also [147].

1018. The ratio of the k of the given reaction to the k of the reaction $C_2H_5 + O_2 = C_2H_5O_2$ is 13; that of the given reaction and of the reaction $C_2H_5 + NO = C_2H_5NO$ is 7.

1019. The k ratio of the reactions $C_2H_5 + I_2 = C_2H_5I + I$ and $C_2H_5 + HI = C_2H_6 + I$ is 8.

1020. E = 0.2 was chosen arbitrarily.

1021. Estimate. The k ratio of the reactions of C_2H_5 with HI and I_2 is 0.15.

1022. Obtained from the measured k ratio of the reactions $C_2H_5 + I_2 = C_2H_5I + I$ (2) and $C_2H_5 + HI = C_2H_6 + I$ (3) ($\lg \frac{k_2}{k_3} = 0.58 + \frac{0.9}{\theta}$; $\theta = 2.303RT$) and $E_2 = 0.2$ was chosen arbitrarily.

1023. The rate constant for recombination of C_2H_5 radicals was chosen as 2.0×10^{13}.

1024. $\Delta \simeq 0.11$.

1025. $\Delta = 0.135$.

1026. $\Delta = 0.11$.

1027. Obtained using the k of the reaction $C_2H_4 + C_2H_4 = C_2H_5 + C_2H_3$, k = $10^{14.82} \exp\left(-\frac{64{,}000}{RT}\right)$ [211] and the k of the reaction $2C_2H_5 \rightarrow C_4H_{10}$, k = $10^{13.61}$ [1403].

1028. $\Delta = 0.132 \pm 0.017$.

1029. $\Delta = 0.13 \pm 0.02$.

1030. $\Delta = 0.12 \pm 0.01$.

1031. Measured was the difference in the E of disproportionation and recombination (1.2); the E of the recombination reaction was chosen as zero.

1032. Obtained on the basis of the measured k of recombination and of the ratio of the k of disproportionation and recombination [820].

1033. $\Delta = 0.136 \pm 0.02$.

1034. The activation energy of the reaction $2C_2H_5 \rightarrow C_4H_{10}$ was taken to be 0.

1035. It is pointed out in [218] that hot C_2H_5 radicals are formed upon photolysis of $Hg(C_2H_5)_2$; this must be ascribed to the differences in obtaining such radicals by this method, as found in the study of C_2H_5 reactions by various authors.

1036. Obtained by the method of intermittent illumination.

1037. $\Delta = 0.125 \pm 0.01$.

1038. Regardless of T, $\Delta = 0.12$.

1039. $\Delta = 0.130 \pm 0.007$.

1040. $\Delta = 0.25$.

1041. $\Delta = 0.13$.

1042. $\Delta = 10^{-0.213 \pm 0.014} \exp\left(-\frac{906 \pm 30}{RT}\right)$. Using the value of Δ measured at room temperature by the authors of [1312] we will have $\Delta = 10^{0.34} \exp\left(-\frac{2{,}340}{RT}\right)$.

1043. $\Delta = 0.065 \pm 0.006$.

1044. $\Delta = 0.06 \pm 0.04$.

1045. $\Delta = 0.081 \pm 0.010$.

1046. $\Delta = 0.053 \pm 0.007$.

1047. $\Delta = 0.181 \pm 0.010$.

1048. $\Delta = 0.2$.

1049. $\Delta = 0.43 \pm 0.03$. The author concludes that in the case of photochemically obtained radicals, Δ is greater than when the radicals are generated in a state of thermodynamic equilibrium.

1050. $\Delta = 0.125 \pm 0.011$.

1051. $\Delta = 0.3$.

1052. $\Delta = 0.21 \pm 0.02$.

1053. $\Delta = 0.43$.

1054. $\Delta = 0.19$. See also [1261] and remarks 1459, 968.

1055. $\Delta = 0.02 \pm 0.02$.

1056. $\Delta = 0.04 \pm 0.005$.

1057. $\Delta = 0.498 \pm 0.02$.

1058. $\Delta = 0.283 \pm 0.2$.

1059. $\Delta = 1.7$.

1060. $\Delta = 0.23 \pm 0.01$.

1061. $\Delta = 0.54 \pm 0.01$.

1062. $\Delta = 0.48$.

1063. $\Delta = 0.31$.

1064. $\Delta = 0.25 \pm 0.01$.

1065. $\Delta = 0.08 \pm 0.04$.

1066. $\Delta = 0.60 \pm 0.01$.

1067. $\Delta = 0.27 \pm 0.01$.

1068. $\Delta = 0.20 \pm 0.02$.

1069. $\Delta = 0.74 \pm 0.3$.

1070. $\Delta = 0.72 \pm 0.01$.

1071. $\Delta \cong 0.8$.

1072. $\Delta = 0.265 \pm 0.05$.

1073. $\Delta = 0.38 \pm 0.03$.

1074. Determined from the yield of CO.

1075. Calculated by the least-squares method on the basis of [53, 228, 645, 838, 976, 1495].

1076. The rate constant of the reaction $2C_2H_5 \rightarrow C_4H_{10}$ was taken to be 10^{14}.

1077. $\Delta = 0.22$.

1078. $\Delta = 0.021 \exp\left(\frac{2{,}200 \pm 200}{RT}\right)$.

1079. $\Delta = 0.4$.

1080. The activation energy for recombination of radicals is taken to be zero.

1081. $\Delta = 0.05 \pm 0.04$.

1082. Calculated from the k of the reverse reaction and from the equilibrium constant under the assumption that the heat of reaction is zero.

1083. The author assumes that the reaction proceeds in two ways:

$$C_2H_5 + NO_2 \rightarrow C_2H_5NO_2^* \rightarrow C_2H_5O + NO$$

and

$$C_2H_5 + NO_2 = HNO_2 + C_2H_4.$$

1084. The authors take the mean value from [1403], $10^{13.41}$, for the k of the reaction $2C_2H_5 \rightarrow C_4H_{10}$. The constant was measured at a pressure of from 0.48 to 10.3 mm Hg in a mixture of $(C_2H_5N)_2$ and $(C_2H_5)_2O$.

1085. The data for 373° were omitted. The authors of [465] view the incorrect determination of the C_2H_5 concentration in [860] as the reason for the deviation (by a factor of 100) from the value they obtained.

1086. Obtained using the k of the reaction $C_2H_5 + Cl_2 = C_2H_5Cl + Cl$ [637].

1087. The authors get 6×10^{-4} for the k ratio of the reaction $C_2H_5 + C_2H_5COC_2H_5 = C_2H_4COC_2H_5$ and the given reaction. The value of 10.05 is given using the recommended k of the first reaction.

1088. Measured at 640 mm hydrogen.

1089. Calculated by the least-squares method on the basis of [921, 980, 1247].

1090. See also [872].

1091. Reasons are expressed in [921] for doubting the correctness of the temperature coefficient for this reaction given in [1404].

1092. See also [922].

1093. The mean value is given.

1094. $\varphi = 1.9 \pm 0.2$.

1095. $\varphi = 1.93 \pm 0.20$.

1096. $\varphi = 2$.

1097. $\varphi = 2.04$.

1098. The authors of [837] point out that their data are based on a direct

determination of the C_2 fraction, and not on an indirect one, as in [839].

1099. $\varphi = 2.56$ at 365° and 3.15 at 510°.

1100. $\varphi = 1.7$ (?).

1101. p = 400 mm Hg, ethane.

1102. Calculated by the least-squares method on the basis of [1012, 1029].

1103. The data of [290, 436] were used.

1104. $\Delta = 0.0985 \pm 0.008$.

1105. The rate constant of recombination of C_2D_5 radicals is taken as 10^{14}.

1106. The rate constant of recombination of CH_3CD_2 radicals is taken as 10^{14}.

1107. This formula is given as an improved formula over the one obtained in [1608].

1108. The k ratio of the given reaction and the reaction $n\text{-}C_3H_7 + O_2 = n\text{-}C_3H_7O_2$ is 22 and that of the given reaction and the reaction $n\text{-}C_3H_7 + NO = n\text{-}C_3H_7NO$ is 11.

1109. The k ratio of the reaction $n\text{-}C_3H_7 + I_2 = n\text{-}C_3H_7I + I$ and of the reaction $n\text{-}C_3H_7 + HI = C_3H_8 + I$ is 3-8.

1110. The k ratio of the given reaction and the reaction $iso\text{-}C_3H_7 + O_2 = iso\text{-}C_3H_7O_2$ is ~3, and that of the given reaction and the reaction $iso\text{-}C_3H_7 + NO = iso\text{-}C_3H_7NO$ is 22.

1111. Estimate. The k ratio of the reactions of $n\text{-}C_3H_7$ with HI and I_2 is 0.11.

1112. The authors state that $\Delta = 0.2$ and is independent of T, in contrast with their previous study [1279].

1113. $\Delta = 0.057 \pm 0.05$.

1114. $\Delta = 0.141 \pm 0.015$.

1115. $\Delta = 0.154 \pm 0.004$.

1116. $\Delta = 0.156 \pm 0.01$.

1117. $\Delta = 0.125 \pm 0.01$.

1118. $\Delta = 0.18$.

1119. $\Delta = 0.408 \pm 0.020$.

1120. $\Delta = 0.5 \pm 0.05$.

1121. $\Delta = 0.12 \pm 0.01$.

1122. $\Delta = 0.690 \pm 0.015$.

1123. $\Delta = 0.5$.

1124. $\Delta = 0.50$. $\Delta = 10^{-0.95} \exp\left(\frac{950}{RT}\right)$ is obtained from the data of [494].

1125. $\Delta = 1.5$ at 30°C and 2 at 200°C.

1126. The mean value is $\Delta = 0.537$.

1127. $\Delta = 0.6$.

1128. $\Delta = 0.7$.

1129. $\Delta = 1.2$.

1130. $\Delta = 0.67$.

1131. $\Delta = 0.52 \pm 0.9$.

1132. $\Delta = 0.52 \pm 0.09$.

1133. The activation energy of recombination of radicals is taken to be zero.

1134. See also [841].

1135. The ratio of the k of recombination of n-C_3H_7 and n-C_4H_9 to the square root of the product of the k of recombination of 2-x n-C_3H_7 and 2-x n-C_4H_9 is 2.0 ± 0.2.

1136. Obtained on the basis of the k of the reaction $2C_3H_7 = C_3H_8 + C_3H_6$, measured between 298 and 464°, $10^{13.20}$, assuming that the recombination constant of $2C_3H_7$ is 10^{14}.

1137. The rate constant of recombination of sec-C_3H_7 radicals is taken to be 10^{14}.

1138. The authors of [916] believe this result to be not completely reliable.

1139. Obtained on the basis of a number of assumptions from the data for $CH_3CD_2CH_2$ with allowance for the isotope effect.

1140. Obtained with $k = 2.2 \times 10^{13}$ for the reactions $2CH_3 \rightarrow C_2H_6$ and $CH_3 + n\text{-}C_3H_7 \rightarrow C_4H_{10}$ [1401].

1141. Calculated by the least-squares method on the basis of [299, 823, 911, 916].

1142. The authors of [954] comment on the approximate nature of their formula, emphasizing in particular the excessively high value of E.

1143. Calculated by the least-squares method on the basis of [917, 954].

1144. $\Delta = 0.63 \pm 0.04$.

1145. According to [207], the k of this reaction is apparently intermediate between the rate constants of addition of HI to C_2H_4 and C_3H_6.

1146. $\Delta = 0.15$.

1147. The k ratio of decay to $\ddot{C}H_3CDCH_2 + D$ and $CD_2CH_2 + CH_3$ at 715° is ~0.017.

1148. Measured was the ratio of the k of the given reaction to the k of the reaction $CH_3CD_2CH_2 \rightarrow CH_3 + CD_2CH_2$.

1149. Measured was the ratio of the k of the given reaction to the k of the reaction $CD_3CHCH_3 \rightarrow D + CD_2CHCH_3$.

1150. $\Delta = 0.14$.

1151. $\Delta = 5$.

1152. $\Delta = 0.078 \pm 0.005$.

1153. $\Delta = 0.075$.

1154. $\Delta = 1.5$ at 24°C and 3.5 at 220°C.

1155. $\Delta = 0.42$.

1156. Calculated from the data of [960] using the quantity $\Delta = 0.165$ determined in [1111].

1157. $\Delta = 0.95$.

1158. $\Delta = 1.5$.

1159. $\Delta = 0.61$.

1160. $\Delta \cong 1.2$.

1161. $\Delta = (0.23)$.

1162. $\Delta = (2.0)$.

1163. 10^5 is given in [147], with reference to [500], for the ratio of the pre-exponential factors of this reaction and of the reaction $(CH_3)_3C + Br_2 = (CH_3)_3CBr + Br$. The activation energy of the latter reaction is taken to be zero.

1164. The difference in E of the given reaction and of the reaction $(CH_3)_3C$ with I_2 is 1.4 and the ratio of the pre-exponential factors is $\cong 1$.

1165. $\Delta = 2.32 \pm 0.05$.

1166. $\Delta = 4.5$ at 23°C and 6.5 at 300°C.

1167. $\Delta = 7.4$. The author concludes that the tert-C_4H_9 radicals are vibrationally excited.

1168. $\Delta = 2.2$.

1169. $\Delta = 3.19$.

1170. $\Delta = 1.33 \pm 0.24$.

1171. Given with reference to [750, 751].

1172. See, however, [825], where the k ratio obtained for the reactions $(CH_3)_2CDCH_2 \rightarrow (CH_3)_2CCH_2 + D$ and $CH_3DCCH_2 + CH_3$ is $\cong 0.004$, more than an order lower than the values extrapolated by the formula given in [1111]. The authors of [825] indicate a probable reason for the inaccuracy of this formula.

1173. Given is the k ratio of decay of iso-C_4H_9 to $(CH_3)_2CCH_2 + H$ and to $CH_3CHCH_2 + CH_3$, calculated from the measured ratio of the corresponding k of decay of the $(CH_3)_2CDCH_2$ radical, taking into account the isotope effect.

1174. Given with reference to [1103].

1175. Given with reference to [278], where E = 40 is given for iso-C_4H_9.

1176. Measured was the k ratio of decay of $(CH_3)_2CDCH_2$ to $(CH_3)_2CCH_2 + D$ and to $CH_3CDCH_2 + CH_3$, the mean value of which is 0.004 in the indicated temperature range.

1177. The rate constant of the given reaction is immeasurably greater than the k of the reaction $(CH_3)_2CDCH_2 \rightarrow (CH_3)_2CCH_2 + D$.

1178. The ratio of the pre-exponential factors of the k of the reactions $(CH_3)_3CCH_2 + HBr = (CH_3)_4C + Br$ and $(CH_3)_3CCH_2 + Br_2 = (CH_3)_3CCH_2Br + Br$ is $10^{5.49} - 10^{6.04}$ and the difference in E is 9.9.

1179. Measured at 300°K in [984] are the k of dissociation of chemically (by attachment of H atoms to olefins) activated (hot) radicals: 3-methyl-butyl-2, 3-methyl-pentyl-2, 3-ethyl-pentyl-2, 2-methyl-pentyl-3, 2-methyl-hexyl-3 and 3-methyl-hexyl-3. Given are the differences between the k of the reactions of hot and thermalized radicals.

1180. The data of [681] for the reaction CH_3 + cyclo-$C_3H_5CHO = CH_4$ + cyclo-C_3H_5CO were used.

1181. Obtained under the assumption that the k of the reaction CH_3 + cyclo-C_3H_5 $\rightarrow$ CH_3-cyclo-C_3H_5 is 10^{14}. The pre-exponential factor is taken to be the same as for cyclo-C_4H_7 [649].

1182. The activation energy was obtained assuming that $A = 10^{13}$.

1183. $\Delta = 1$.

1184. $\Delta = 0.45$.

1185. The yields of cyclo-C_6H_8-1,3, cyclo-C_6H_8-1,4 and $C_{12}H_{14}$ are 11, 20 and 69%, respectively.

1186. Given is the ratio of the k of the given reaction to the k of the reaction $C_2H + HC_2Br = C_4H_2 + Br$.

1187. The approximate formula (estimate) for the k of the reverse reaction, $k_- \simeq 10^{13.8} \exp\left(-\frac{6{,}000}{RT}\right)$ was used.

1188. The ratio of the k of the given reaction to the k of the reaction $C_2H_3 + C_2H_3Cl \rightarrow C_4H_6Cl$ is 29.

1189. The rate constant of the reverse reaction was set arbitrarily as $k_- = 10^{12.8} \exp\left(-\frac{1{,}000}{RT}\right)$.

1190. The formula (estimate) $k_- \simeq 10^{13.0} \exp\left(-\frac{4{,}700}{RT}\right)$ was used.

1191. Given with reference to [257, 1072].

1192. The approximate value (estimate) $k_- = 10^{13.4}$ was used.

1193. The approximate value (estimate) $k_- = 10^{13.7}$ was used.

1194. The approximate value (estimate) $k_- = 10^{11.13}$ was used.

1195. According to [552], the pre-exponential factor may be erroneous because of the failure to account for light absorption by the diphenyl.

1196. The activation energy of the reaction $C_6H_5CH_2 + Br_2 = C_6H_5CH_2Br + Br$ was taken to be zero. The ratio of the pre-exponential factor of this reaction and of the reaction given in the table is $1 : 10^3$.

and of the reaction given in the table is 1:10^3.

1197. The k ratio of the reactions of $C_6H_4CH_3$ with D_2 and with $C_6H_4(CH_3)_2$ is 24.6. According to [271], this ratio is 10.7 at 700°.

1198. The rate constant of the reaction $C_6H_5OCH_2 + CH_3 \rightarrow C_6H_5OC_2H_5$ was taken to be 3.3×10^{13}.

1199. The ratio of the k of the given reaction to the square root of the k of the reaction $2CF_2 \rightarrow C_2F_4$ is $10^{1.86}$.

1200. The ratio of the k of the given reaction to the square root of the k of recombination of CF_2 radicals is 72.7.

1201. See also [399].

1202. The ratio of the k of the given reaction, which is considered to be the reaction CF_2(triplet) + $C_2F_4 \rightarrow$ cyclo-C_3F_6, to the k of the reaction CF_2(triplet) + $O_2 \rightarrow CF_2O_2$ is 0.40.

1203. The rate constant of $CF_3 + CF_3 \rightarrow C_2F_6$ is taken to be $10^{13.36}$ [61].

1204. See also [320, 1269].

1205. See also [1265].

1206. See also [1266].

1207. Calculated by the least-squares method on the basis of [37, 66, 1272].

1208. Calculated by the least-squares method on the basis of [66, 1272].

1209. The formula $10^{0.578\pm0.084} \exp\left(\frac{2171 \pm 159}{RT}\right)$ was obtained for the ratio of the k of the given reaction to the k of the reaction $CF_3 + HBr = CF_3H + Br$.

1210. The formula $10^{0.638\pm0.062} \exp\left(\frac{2983 \pm 118}{RT}\right)$ was obtained for the ratio of the k of the given reaction to the k of the reaction $CF_3 + HBr = CF_3H + Br$.

1211. Obtained using the k of the reaction $CF_3 + Br_2 = CF_3Br + Br$, $k = 10^{12.36} \times \exp\left(-\frac{700}{RT}\right)$ [22, 1533].

1212. The k ratio of the given reaction and the reaction $CF_3 + Br_2 = CF_3Br + Br$ is $10^{-0.33\pm0.08} \exp\left(-\frac{3,000 \pm 260}{RT}\right)$. Along with the expression $10^{-0.58\pm0.08} \times \exp\left(-\frac{2,170 \pm 160}{RT}\right)$ obtained in [1533] at 328-607°, the authors also give $10^{-0.58\pm0.04} \exp\left(-\frac{2,130 \pm 90}{RT}\right)$ for 328-755°.

1213. The k of the reaction $CF_3 + I_2 = CF_3I + I$, i.e., 2.6×10^{12}, was used.

1214. Given are the ratio of the k of the reaction $CF_3 + CH_3 = CF_3CH_3 + M$ to the k of the given reaction for T = 423° and various M, and also the following relative efficiencies: cyclo-C_6F_{12}:$(CF_3)_2CO$:$(CH_3)_2CO$:N_2 = 1.00:071:031:0.053.

1215. The values of A, E and k_H/k_D were calculated theoretically for various reactions and compared with the data known from the literature. It is assumed that the activation energy of recombination of CF_3 radicals is zero. If the latter is equal to 2 kcal/M, E should be 1 kcal/M greater.

1216. The rate constant was obtained on the basis of [9, 67, 68, 320, 626].

1217. Obtained under the assumption of a certain reaction volume.

1218. Calculated by the least-squares method on the basis of [9, 67, 320, 626, 1274].

1219. In conformity with the theory of Bigeleisen, $\ln \frac{k}{k'} = \ln 1.40 + \frac{0.420 \times 10^6}{T^2}$ was obtained for the k ratio of the given reaction and the reaction $CF_3 + CH_2D_2 = CDF_3 + CH_2D$.

1220. See also [922].

1221. The recombination rate constant of CF_3 was taken to be $10^{13.34}$.

1222. Calculated by the least-squares method on the basis of [9, 67, 68, 320, 626, 1144, 1272, 1274].

1223. Calculated by the least-squares method on the basis of [68, 1144, 1272, 1274].

1224. $A/\sqrt{A_p}$ and $E - 1/2\, E_p$ are given.

1225. The rate constant of the reaction $2CF_3 = C_2F_6(k_2)$ was taken to be 2.3×10^{13} [61]. Also used were the data of [68] for k_8: $\sqrt{k_2}$ (CF_3 + iso-C_4H_{10} = CF_3H + tert-C_4H_9, k_8).

1226. The k of the reaction $CF_3 + CH_4 = CF_3H + CH_3$, $10^{11.88} \exp\left(\frac{10,800 \pm 400}{RT}\right)$, was used.

1227. Using the recommended formula for the reaction $CF_3 + CH_4 = CF_3H + CH_3$ we will have $k = 10^{10.83} \exp\left(-\frac{7,660}{RT}\right)$.

1228. Using the recommended formula for the reaction $CF_3 + CH_4 = CF_3H + CH_3$ we will have $k = 10^{11.83} \exp\left(-\frac{7,660}{RT}\right)$.

1229. The ratio of the k of the given reaction to the k of the reaction CF_3 + $CD_3OH = CF_3H + CD_3O$ is $10^{1.36} \exp\left(-\frac{2,290 \pm 100}{RT}\right)$ and the k of the reaction $CF_3 + CH_3OH = CF_3H + CH_2OH$ is $10^{0.4} \exp\left(-\frac{2,300 \pm 800}{RT}\right)$.

1230. Using the recommended formula for the reaction $CF_3 + CH_4 = CF_3H + CH_3$ we will have $k = 10^{11.93} \exp\left(-\frac{9,460}{RT}\right)$.

1231. See, however, [627].

1232. The rate constant of CF_3 recombination is taken to be $10^{13.34}$ [61].

1233. Obtained using the k of the deactivation process $O'(^1D) + O_2 = O + O_2$, $k = 10^{13.38}$.

1234. This formula is considered by the authors of [626] to be more accurate (the formula was obtained for a mixture containing CD_4).

1235. According to [10], the k ratio of the reactions $CF_3 + CH_2Cl_2 = CHF_3 + CHCl_2$ and $CF_3 + CH_2Cl_2 = CF_3Cl + CH_2Cl$ is $(0.49 \pm 0.3) \exp\left(\frac{4,200 \pm 600}{RT}\right)$ in the temperature interval 306-449°C.

1236. The reason for the divergence of the data obtained for the photolysis of CF_3COCF_3 and CF_3NNCF_3 is discussed in [11]. The authors arrive at the conclusion that the former are more reliable.

1237. Measurements at 25 mm Hg of CH_3Br + 20 mm Hg for CF_3COCF_3.

1238. Measurements at 180 mm Hg of CH_3Br + 20 mm Hg for CF_3COCF_3. The authors do not explain the pressure dependence of k obtained by them.

1239. Obtained from the measured k ratio of the given reaction and of the reaction of CF_3 with 2,3-dimethylbutane, 2.2×10^9.

1240. Obtained from the measured k ratio of the given reaction and of the reaction CF_3 + 2,3-dimethylbutane = $CF_3H + C_6H_{13}$ using the k of the latter, taken from [1272], but with E = 4.7 (see [422], table V).

1241. The ratio of the k of the given reaction to the k of the reaction $CF_3 + [(CH_3)_2CH]_2 = CF_3H + (CH_3)_2CCH(CH_3)_2$ is 93.0.

1242. The ratio of the k of the given reaction to the k of the reaction $CF_3 + [(CH_3)_2CH]_2 = CF_3H + (CH_3)_2CCH(CH_3)_2$ is 278.

1243. The ratio of the k of the given reaction to the k of the reaction $CF_3 + [(CH_3)_2CH]_2 = CF_3H + (CH_3)_2CCH(CH_3)_2$ is 101.0.

1244. The ratio of the k of the given reaction to the k of the reaction $CF_3 + [(CH_3)_2CH]_2 = CF_3H + (CH_3)_2CCH(CH_3)_2$ is 781.

1245. The ratio of the k of the given reaction to the k of the reaction $CF_3 + [(CH_3)_2CH]_2 = CF_3H + (CH_3)_2CCH(CH_3)_2$ is 49.8.

1246. See, however, [1210].

1247. The ratio of the k of the given reaction to the k of the reaction $CF_3 + [(CH_3)_2CH]_2 = CF_3H + (CH_3)_2CCH(CH_3)_2$ is 0.82.

1248. This E is obtained if it is considered that the reactions $CH_3 + CH_3 \rightarrow C_2H_6$ (2) and $CH_3 + CF_3 \rightarrow CH_3CF_3$ (1) do not have an activation energy. The authors found $E = 2.14 + 2E_1 - E_2$.

1249. $\varphi = 1.95$.

1250. $\varphi = 1.77 \pm 0.10$.

1251. The ratio of the k of the given reaction to the k of the reaction $CF_3 + [(CH_3)_2CH]_2 = CHF_3 + (CH_3)_2CCH(CH_3)_2$ is 7.0.

1252. The ratio of the k of the given reaction to the k of the reaction CF_3 + $[(CH_3)_2CH]_2$ = CHF_3 + $(CH_3)_2CCH(CH_3)_2$ is 31.7.

1253. The temperature is given approximately.

1254. $\varphi = 2.0 \pm 0.5$.

1255. The ratio of the k of the given reaction to the k of the reaction CF_3 + $[(CH_3)_2CH]_2$ = CHF_3 + $(CH_3)_2CCH(CH_3)_2$ is 36.8.

1256. The rate constant of recombination of C_2F_5 radicals was taken to be $10^{14.04}$.

1257. The rate constant of the reaction $2C_2F_5 \rightarrow C_4F_{10}$ was taken to be 10^{14}.

1258. Calculated by the least-squares method on the basis of [975, 1259, 1266].

1259. The authors of [1265] consider these data to be more accurate than those they obtained earlier.

1260. The ratio of the k of the given reaction to the k of the reaction $C_2F_5 + Br_2$ = $C_2F_5Br + Br$ is $10^{-0.45 \pm 0.06} \exp\left(-\frac{2{,}750 \pm 250}{RT}\right)$.

1261. The rate constant of the reaction $2C_3F_7 \rightarrow C_6F_{14}$ was taken to be 10^{14}.

1262. Calculated by the least-squares method on the basis of [623, 1123, 1266].

1263. $\frac{k_{ab}}{\sqrt{k_{aa}k_{bb}}} = (0.743 \pm 0.046) \exp\left(\frac{1440 \pm 50}{RT}\right)$ was obtained for the relationship between the k of recombination of C_3F_7 radicals with $C_3F_7(k_{bb})$, CH_3 radicals with $CH_3(k_{aa})$ and C_3F_7 radicals with $CH_3(k_{ab})$.

1264. $\Delta = 0.6(298°)$ and $3.5(577°)$. Under the conditions of [1282], recombination takes place in the intermediate pressure range. See also remark 1674.

1265. The rate constant of reaction of CH_2F radicals was taken as 2.2×10^{13}.

1266. The rate constant of recombination of CHF_2 radicals was taken to be $10^{13.36}$.

1267. The rate constant of recombination of CHF_2 radicals was taken to be 2.2×10^{13}.

1268. The ratio of the k of the given reaction to the square root of the k of recombination of CCl_3 is $10^{5.46} \exp\left(-\frac{5,300}{RT}\right)$.

1269. The ratio of the k of the given reaction to the k of the reaction $CCl_3 + C_2Cl_5 \rightarrow$ products is $10^{0.18} \exp\left(-\frac{7,720}{RT}\right)$ and to the square root of the k of the reaction $2\ CCl_3 \rightarrow C_2Cl_6$ is $10^{5.46} \exp\left(-\frac{5,300}{RT}\right)$.

1270. The k ratio of the reactions $CCl_3 + HBr = CCl_3H + Br$ (1) and $CCl_3 + Br_2 = CCl_3Br + Br$ (2) is $k_1 : k_2 = 0.04$, $E_1 = E_2 \leq 7$.

1271. The value of the k of the reaction $2\ CCl_3 \rightarrow C_2Cl_6$, namely, $k = 6.31 \times 10^{11}$ [499], was used. See, however, [1481, p. 1218].

1272. The k ratio of the reactions of splitting of primary (k_P) and secondary (k_S) H atoms is $k_P : k_S = 0.67 \exp\left(\frac{3,640}{RT}\right)$. The total constant $k = 6\ k_P + 4\ k_S$.

1273. See also [1478, 1482].

1274. $\Delta = 0.11 \pm 0.02$.

1275. The rate constant was taken equal to the k of the reaction $CCl_3 + n\text{-}C_4H_{10} = CHCl_3 + CH_3CH_2CHCH_3$.

1276. Given with reference to [1481].

1277. Given in [1478] were lg A = (10.3) and E = (7.2).

1278. The value of A was calculated from a graph, the k of recombination of CCl_3 radicals being taken equal to 10^{14}.

1279. $\Delta = 0.22 \pm 0.03$; $\varphi = 2$.

1280. $\varphi = 2.0$.

1281. Given in [1107] is $A = 10^{8.84}$.

1282. Obtained on the basis of the measured (in [451]) k of the reaction $CCl_3 + Cl_2 = CCl_4 + Cl$ and the ratio of this constant to the square root of the k of recombination.

1283. See, however, [1478, p. 42].

1284. $\Delta = 0.14 \pm 0.03$.

1285. $\varphi = 2.5 \pm 0.2$.

1286. The rate constant of $2\ CF_2Cl \rightarrow C_2F_4Cl_2$ was taken to be independent of the temperature.

1287. $\Delta = 0.04$.

1288. $\Delta < 0.5$.

1289. $\varphi = 2.4$.

1290. $\varphi \simeq 2$.

1291. $\varphi = 2.2$.

1292. Given with reference to [346, 636].

1293. $\Delta \leq 0.1$.

1294. The difference in E of the given reaction and 1/2E of the recombination of $C_2H_3Cl_2$ radicals is ~ 0.

1295. The activation energy was taken to be 0.

1296. The difference in E of the given reaction and 1/2E of the recombination of $CHClCHCl_2$ radicals is 3.1.

1297. The activation energy of recombination of C_2HCl_4 radicals is taken to be 0.

1298. The difference in E of the given reaction and 1/2E of the recombination of C_2HCl_4 radicals is 5.4.

1299. The ratio of the k of the given reaction to the square root of the k of the reaction $2\ C_2HCl_4 \rightarrow$ products is $10^{5.44 \pm 0.02} \exp\left(-\frac{4{,}880 \pm 40}{RT}\right)$.

1300. The rate constant of the reaction $2\ C_2HCl_4 \rightarrow C_4H_2Cl_4$ was taken to be $10^{12.48} \exp\left(-\frac{500}{RT}\right)$ [430].

1301. See [343], where a more exact value is given, with reference to Dainton, for the ratio of the k of the given reaction to the square root of the k of the reaction 2 $C_2HCl_4 \to$ products.

1302. The difference in E of the given reaction and 1/2E of the reaction of C_2Cl_3 radicals (recombination + disproportionation) is 7.4 (from the values given in [1373] for the ratio of the k of the given reaction to the square root of the k of the reaction of the radicals we get E = 8.45 and lg A: $\sqrt{A_{rad}}$ = 2.72).

1303. The ratio of the k of the given reaction to the square root of the k of recombination (or disproportionation) of C_2Cl_5 is $10^{4.06} \exp\left(-\frac{3{,}000 \pm 500}{RT}\right)$. The rate constant of the latter reaction was taken to be 10^{14}.

1304. The ratio of the k of the given reaction to the k of the reaction $C_2Cl_5 \to C_2Cl_4 + Cl$ is $10^{4.7} \exp\left(\frac{16{,}240}{RT}\right)$ and to the square root of the k of recombination of C_2Cl_5 is $10^{4.06} \exp\left(-\frac{3{,}020}{RT}\right)$ (366-428°).

1305. The ratio of the k of the reaction $C_2H_2Br \to C_2H_2 + Br$ to the k of the given reaction is $10^{4.54} \exp\left(-\frac{5{,}800 \pm 500}{RT}\right)$.

1306. The difference in E of the given reaction and of the reaction $C_2H_2Br + Br_2 = C_2H_2Br_2 + Br$ is 5.8 ± 0.5.

1307. The difference in E of the given reaction and of the reaction $C_2H_2Cl_2Br + Br_2 = C_2H_2Cl_2Br_2 + Br$ is 6.2.

1308. The rate constant of the reaction 2 $CCl_3C_2H_4 \to (CCl_3C_2H_4)_2$ was taken to be 10^{11}.

1309. According to [1095], the reaction apparently takes place according to the scheme 2 NH = N_2 + 2H.

1310. Mean value in the temperature interval 1900-2400°.

1311. The ratio of the rate constants of the reactions of NH with O_2, C_3H_6 and C_2H_4 is 40 : 2 : 1.

1312. The rate constant is pressure-independent in the range 425-850μ.

1313. The constant is essentially independent of T in the temperature range 2,300-3,000°.

1314. By correcting the data of [1002] (dividing the pre-exponential factor by 2.7) the author of [461] shows that these corrected data are close to the extrapolated Arrhenius line obtained in [461].

1315. See also [537].

1316. Obtained using the data of [469, 895, 1628].

1317. Obtained on the basis of the measured value of the constant at 300°, the k ratio of the reactions $OH + H_2 = H_2O + H$ and $OH + CO = CO_2 + H$, measured in [89, 471, 474, 532,1535], and the k of the reaction $OH + CO = CO_2 + H$ from the data of [470, 474, 532, 871, 1589, 1590]. See also [91].

1318. This formula was obtained on the basis of the value of the constant measured at 310° and of the data of [537].

1319. Obtained using the result of [895].

1320. Calculated by the least-squares method on the basis of [469, 471, 474, 685, 895, 1326, 1628, 1707].

1321. The author also gives the formula $k_{OH+D_2}/k_{OH+CO} = 17 \exp\left(-\frac{4,400}{RT}\right)$ for the k ratio of the given reaction and the reaction of OH with CO. He considers this formula to be more accurate than the formula obtained in [1535], $k_{OH+D_2}/k_{OH+CO} = 160 \exp\left(-\frac{6,400}{RT}\right)$.

1322. Calculated on the basis of the measured k ratio of the given reaction and the reaction $OH + H_2 = H_2O + H$ and of the recommended k of the latter reaction.

1323. Obtained by the least-squares method on the basis of [687, 1535].

1324. The formula recommended in [895] was obtained on the basis of the value of k measured at 310° [450] and the accepted value of E = 1,000 ± 500 cal/M.

1325. See also [488, 1374, 1408].

1326. 4.7 was obtained for the k ratio of the reactions $OH + H_2O_2 = H_2O + HO_2$ and $OH + H_2 = H_2O$ at 500°C. The rate constant of the given reaction was calculated on the basis of the recommended k of the reaction $OH + H_2 = H_2O + H$.

1327. 10 was obtained for the k ratio of the reactions $OH + H_2O_2 = H_2O + HO_2$ and $OH + CO = CO_2 + H$. The recommended formula was used.

1328. Calculated on the basis of [89, 91, 683, 684, 783].

1329. The authors of [1189] believe that the 30-fold discrepancy between the rate constants resulting from the inaccuracy of the two methods of determining k (because of a number of assumptions made in doing so), namely, from the rate of flame propagation and from the temperature dependence of the lower ignition limit, must be considered inadmissible.

1330. Calculated by the least-squares method on the basis of [1189, 1441]. Because of the large pre-exponential factor the formula (and possibly the reaction mechanism) is dubious.

1331. It was shown in [1623] that the value for the k of the given reaction obtained in [729] is too low.

1332. The value of [759] corrected according to [1623].

1333. For other formulas proposed by a number of authors see [1289].

1334. The k ratio of the reactions of OH with H_2 and CO is $(31 \pm 5)\exp\left(-\frac{4{,}000 \pm 300}{RT}\right)$ and that of the reactions of OH with D_2 and CO is (160 ± 30) $\exp\left(-\frac{6{,}400 \pm 30}{RT}\right)$. The formula for the k of the reaction $OH + CO = CO + H$ was obtained on the basis of the recommended formula for the k of the reaction $OH + H_2 = H_2O + H$.

1335. Obtained on the basis of [87, 469, 474, 532, 533, 1535, 1589]. See also [1372].

1336. Obtained on the basis of the constant measured at 300° and of an analysis of the experimental data at high temperatures.

1337. On the basis of the data of [532, 803, 1073, 1251].

1338. Obtained on the basis of the data of [532, 1589, 1693].

1339. Obtained from the data of [87, 471, 1535]. If, in addition, the data of [532, 1589, 1590, 1693] are used, k is expressed by the formula $k = 10^{12.6 \pm 0.3} \times \exp\left(-\frac{6,200 \pm 600}{RT}\right)$.

1340. Calculated by the least-squares method on the basis of the data of [89, 474, 532, 685, 759, 871, 1256, 1535, 1623].

1341. According to [185], the k ratio of the given reaction and of the reaction of $OH + CO = CO_2 + H$ at 525°C is 2.1.

1342. See, however, [1424, p. 606].

1343. $10^{2.2} \exp\left(-\frac{7,000}{RT}\right)$ is obtained for the k ratio of the reactions $OH + CH_4 = H_2O + CH_3$ and $OH + CO = CO_2 + H$; from this, on the basis of the recommended formula (the k of the reaction $OH + CO = CO_2 + H$), follows $k = 10^{13.8} \times \exp\left(-\frac{7,810 \pm 1,600}{RT}\right)$. See also [784a].

1344. The k ratio of the reactions $OH + CH_4 = H_2O + CH_3$ and $OH + H_2 = H_2O + H$ is 1.0 ± 0.2. The constant was calculated from the recommended k of the reaction $OH + H_2 = H_2O + H$.

1345. Calculated from the data of [185].

1346. Given with reference to [258].

1347. Obtained using the data of [185, 474, 539, 781, 1589].

1348. Obtained using the data of a number of authors for the k ratio of the given reaction and the reaction $OH + CO = CO_2 + H$ and the k of the latter reaction, $10^{11.5} \exp\left(-\frac{600}{RT}\right)$ [474].

1349. Calculated by the least-squares method on the basis of [94, 473, 539, 595, 685, 1589, 1625].

1350. Calculated on the basis of the measured k ratio of the given reaction and the reaction $OH + H_2 = H_2O + H$ using the recommended value for the latter constant.

1351. Obtained on the basis of the data of [98, 686], which are apparently more accurate.

1352. Calculated by the least-squares method on the basis of [97, 1590, 1692].

1353. Calculated by the least-squares method on the basis of [543, 1256, 1692]. The formula cannot be considered reliable because the data of [1692], in which the OH radicals were obtained from a discharge in water vapor, were used in its derivation.

1354. 33 ± 3 was obtained at 500°C in [185] for the k ratio of the given reaction and of the reaction $OH + CH_4 = H_2O + CH_3$ under the assumption that the reaction OH + HCHO predominates over the reactions of HO_2 and O_2 with HCHO. The recommended k of the last reaction was used.

1355. Obtained from the measured k ratio of the given reaction and of the reaction $OH + CO = CO_2 + H$ and the recommended value for the k of the latter.

1356. The k ratio of the reactions $OH + CHCO = H_2O + CHO$ and $OH + CH_4 = H_2O + CH_3$ in the temperature interval 798-923° can be expressed by the formula $10^{0.16} \exp\left(\frac{5,000}{RT}\right)$. Using the recommended k of the latter reaction this yields the formula given in the table.

1357. Given as a preliminary result.

1358. Mean of the data of [185, 781, 1590].

1359. The value of the k of the reaction $2OH = H_2O + O$, measured in [450], was used.

1360. Obtained using the k of hydroxyl recombination, measured in [1196]. The data of [176], which differ from those of [287] by a factor of ~60, must be considered less accurate. See [287, 802].

1361. The reaction probably takes place according to the scheme $2\ OH + H_2O_2 = 2\ H_2O_2$ [688].

1362. Given with reference to a communication of Davidson.

1363. The rate constant of the reaction $2\ HO_2 = H_2O_2 + O_2$ was taken to be 1.8×10^{12} (given with reference to Foner and Hudson, who give this figure for 20°C). See also [91].

1364. According to [118], the k ratio of the reactions $HO_2 + H_2 = H_2O + OH$ (k_1) and $HO_2 + H_2O = H_2O_2 + OH$ (k_2) at room temperature is $k_2 : k_1 = 4{,}700$, from which the authors of [118] conclude that $E_1 - E_2 = 5$.

1365. 280 ± 60 was obtained for the k ratio of the reactions $HO_2 + HCHO = H_2O_2 + HCO$ and $HO_2 + CO = CO_2 + OH$.

1366. According to [185], the ratio of the k of the given reaction to the k of the reaction $HO_2 + CO = CO_2 + OH$ at 525°C is 340 ± 80.

1367. See also [1284].

1368. The ratio of the k of the given reaction to the k of the reaction $CN + O_2 = NCO + O$ is 0.1.

1369. According to [1370], $k = 4.7 \times 10^8$ at 300°. The reaction products are not indicated in [1223].

1370. Calculated on the basis of [1223, 1370].

1371. The ratio of the k of the given reaction to the k of the reaction $CN + O_2 = NCO + O$ is 6.2.

1372. The ratio of the k of the given reaction to the k of the reaction of CN with C_2H_6 is $20.6 \exp\left(-\frac{3{,}700 \pm 200}{RT}\right)$.

1373. The ratio of the k of the given reaction to the k of the reaction $CN + C_3H_8 = HCN + iso\text{-}C_3H_7$ is $1.1 \exp\left(\frac{100 \pm 300}{RT}\right)$ and to the k of the reaction $CN + C_3H_8 = HCN + n\text{-}C_3H_7$ is $1.0 \exp\left(\frac{100 \pm 200}{RT}\right)$.

1374. The ratio of the k of the given reaction to the k of the reaction $CN + C_3H_8 = HCN + iso\text{-}C_3H_7$ is $1.2 \exp\left(\frac{100 \pm 300}{RT}\right)$.

1375. Given with reference to [1329].

1376. If the reaction takes place according to a second-order law, $k = 10^{12.3}$.

1377. $\Delta = 0.5$. Given with reference to unpublished work by Phillips.

1378. $\Delta = 0.1$.

1379. The given reaction is 80 times faster than the reaction $CH_3O + (CH_3)_2CO = CH_3OH + CH_2COCH_3$.

1380. According to [789], the k of the given reaction at 373° is 80 times greater than the k of the reaction $CH_3O + CH_3COCH_3 = CH_3OH + CH_2COCH_3$. The difference in E of these reactions is -7 (T = 373-423°).

1381. Obtained under the assumption that the k of the reaction $CH_3 + CH_3OH = CH_4 + CH_3O$ is equal to the k of $CD_3 + CD_3OH = CD_3H + CD_3O$ and under a number of other assumptions.

1382. Obtained using the k of the reaction $CH_3 + CH_3O \rightarrow CH_3OCH_3$, $k = 10^{13.5}$ [158].

1383. Given in [669] (with reference to [158]) is a value of lg A which is lower by 0.4, in view of the fact that different values for the k of the reaction $CH_3 + CH_3O \rightarrow CH_3OCH_3$ ($10^{13.1}$ and $10^{13.5}$) were used in these studies.

1384. Calculated on the basis of the data of [158, 1401] with $k = 10^{13.1}$ for the reaction $CH_3 + CH_3O \rightarrow CH_3OCH_3$ [668].

1385. $\Delta = 9.3 \pm 0.6$.

1386. $\Delta = 60$.

1387. Obtained from the measured k ratio under the assumption that the k of the reactions $2\ CH_3 \rightarrow C_2H_6$ and $CH_3 + CH_3O \rightarrow CH_3OCH_3$ are $10^{13.34}$ [1401] and $10^{13.1}$ [670], respectively.

1388. The difference in E of the given reaction and the reaction $CH_3O + HCHO = CH_3OH + HCO$ is 3.0-4.0. Given in [669], with reference to [1465], is E = 6.0.

1389. Given with reference to [788a], where the formula 150 $\exp\left(-\frac{3{,}000}{RT}\right)$ was obtained for 323-408°, expressing the k of the given reaction to the square root of the k of the reaction 2 $CH_3O = CH_3OH + HCHO$.

1390. The rate constants of the reactions $CH_3O + CH_3 \rightarrow (CH_3)_2O$ and $2CH_3 \rightarrow C_2H_6$ were taken to be 10^{14} and $10^{13.34}$.

1391. Calculated from the measured values of the quantity $\frac{k_8\sqrt{k_6}}{k_4}$, where k_8, k_6 and k_4 are the k of the reactions $CH_3O + CH_3COOCH_3 = CH_3OH + CH_2COOCH_3$ (k_8), 2 $CH_3 \rightarrow C_2H_6$ (k_6) and $CH_3 + CH_3O \rightarrow CH_3OCH_3$ (k_4), assuming that $E_6 = 0$, $E_4 = 0$.

1392. Given in [669], with reference to [1601], were E = 6.6 and lg A = 10.6.

1393. The authors of [1144] estimate k with accuracy to within an order of magnitude.

1394. Obtained on the basis of the data given in [1239, 1424].

1395. The ratio of the k of the given reaction to the k of the reaction $CH_3O + NO_2 \rightarrow CH_3ONO_2$ is 2.7.

1396. The ratio of the k of the reaction $CH_3O + NO \rightarrow CH_3ONO$ to the k of the given reaction is 1.8.

1397. Calculated from the k of the reverse reaction.

1398. $\Delta = 1.4$.

1399. $\Delta = 1.8$.

1400. $\Delta < 0.075$?

1401. $\Delta \geq 5.7$?

1402. Obtained under the assumption that the E of the reaction 2 $CH_2OH \rightarrow (CH_2OH)_2$ is 0.

1403. The ratio of the k of the given reaction to the k of the reaction $C_2O + C_4H_6 = C_5H_6 + CO$ is 100 ± 20 and to the total k of the reaction $C_2O + O_2 = CO_2 + CO$ and 2 CO + O is 135 ± 30.

1404. $\Delta = 0.46$.

1405. $\Delta = 2.3$.

1406. The rate constant of the reaction $C_2H_5O + C_2H_5 \rightarrow (C_2H_5)_2O$ was set at $10^{13.34}$.

1407. $\Delta = 1.3$.

1408. The ratio of the k of the given reaction to the k of the reaction $C_2H_5O \rightarrow HCHO + CH_3$ is expressed by the formula $10^{0.8 \pm 0.3} \exp\left(\frac{10,700 \pm 1,500}{RT}\right)$.

1409. $\Delta \simeq 12$.

1410. $\Delta = 12 \pm 2$.

1411. The ratio of the k of the given reaction to the k of the reaction $C_2H_5O + NO_2 \rightarrow C_2H_5ONO_2$ is 2.5.

1412. Calculated using the average value of the k of the reverse reaction, $k = 1.6 \times 10^{14} \exp\left(- \frac{34,100}{RT}\right)$, [715], obtained from the data of [721, 1306, 1149].

1413. The rate constant of the recombination of radicals is taken to be 2.2×10^{13}.

1414. Obtained assuming that the E of the reaction $2\ CH_3OCH_2 \rightarrow CH_3OCH_2CH_3OCH_2$ is 0.

1415. $\Delta = 0.16$ [407].

1416. Obtained from the measured k ratio of the reaction of disproportionation and attachment (0.15 ± 0.03) and from the calculated k of the latter reaction, 6×10^{10}.

1417. Obtained from the measured $k = k_{11}k_{12}/(k_{-11} + k_{12})$ (see remark 874), assuming that $k_{-11} \gg k_{12}$ using $K = k_{11}/k_{-11}$ [298].

1418. Obtained under the assumption that the k of the reaction $(CH_3)_2CHO$ + ester = $(CH_3)_2CHOH + R$ is $k = 10^{11} \exp\left(- \frac{4,000}{RT}\right)$.

1419. See also [546, 767].

1420. The relative efficiencies at 200°C are iso-$C_3H_7ONO : H_2 : Ar : N_2 : CO : NO : CO_2 : N_2O : SF_6 = 1.00 : 0.20 : 0.08 : 0.12 : 0.14 : 0.10 : 0.38 : 0.39 : 0.40$.

1421. This formula is considered by the authors of [407] to be more accurate than the one obtained earlier [546], when the measurements were made at constant pressure. Given in [407] are the relative efficiencies of 18 gases.

1422. Found using the k of the reaction $(CH_3)_2CHO + NO = (CH_3)_2CO + HNO$, $k \simeq 10^{10}$ $(E = 0)$ [33]. The previously obtained formula [1024] is considered by the authors of [407] to be less accurate.

1423. The relative efficiencies are $(CH_3)_2CHONO : Ar : N_2 : NO : CO_2 : C_2H_6 : C_3H_8 : n\text{-}C_4H_{10} : (CH_3)_3CH = 1.00 : 0.06 : 0.04 : < 0.1 : 0.4 : 0.7 : 0.7 : 0.6$.

1424. The ratio of the k of the given reaction to the k of the reaction $(CH_3)_3CO \rightarrow CH_3COCH_3 + CH_3$ is $10^{2.43} \exp\left(\frac{3{,}000}{RT}\right)$.

1425. The ratio of the k of the given reaction to the k of the reaction tert-$C_4H_9O + NO_2 \rightarrow$ tert-C_4H_9ONO is 1.7.

1426. Calculated using the mean value of the k of the reverse reaction, $k = 4 \times 10^{15} \exp\left(-\frac{37{,}500}{RT}\right)$ [715], obtained from the data of [1168, 1302].

1427. The rate constant of the reaction $(CH_3)_3CO + NO \rightarrow (CH_3)_3CONO$ is taken to be $10^{10.5}$.

1428. M corresponds to a mixture of $[(CH_3)_3CO]_2$ and NO.

1429. The authors of [767] show that the assumption made in [172, 1079] and elsewhere that the reaction is first order does not correspond to reality, since it leads in particular to an excessively low value for the pre-exponential factor. With the aid of the data of [429] the authors of [767] get a value for the pre-exponential factor, $10^{13.64 \pm 0.7}$, which is close to that given in the table.

1430. See also [229, 243, 669 (pp. 96-97), 767, 1082, 1158, 1159, 1273, 1309, 1528, 1558].

1431. See also [122].

1432. Trotman-Dickenson points out [1524, p. 306], that both A and E can be lower than as listed here.

1433. The activation energy of the reaction $(CH_3)_3CO + NO \rightarrow (CH_3)_3CONO$ was taken to be 0. The rate constant of this reaction and of the reaction $CH_3 + NO \rightarrow CH_3NO$ were considered to be equal. See, however, [767].

1434. Obtained with $k = 3.3 \times 10^{13}$ for the reaction $C_6H_5OCH_2 + CH_3 \rightarrow C_6H_5OC_2H_5$.

1435. The ratio of the k of the given reaction to the k of the reaction iso-$C_3H_7O_2 \rightarrow CH_3CHO + CH_3O$ is expressed by the formula $10^{1.8 \pm 0.3}$ exp $\left(\frac{12{,}600 \pm 1{,}600}{RT}\right)$.

1436. The ratio of the k of the given reaction to the k of the reaction iso-$C_3H_7O_2 \rightarrow CH_3CHO + CH_3O$ is expressed by the formula $10^{0.9}\exp\left(\frac{16{,}700 \pm 1{,}500}{RT}\right)$.

1437. For a critique see [300].

1438. Obtained on the basis of the data of various authors and of a number of assumptions.

1439. See, however, [130].

1440. The difference in E of the reactions $HCO \rightarrow H + CO$ (1) and $HCO + O_2 = CO_2 + OH$ (2) is $E_1 - E_2 \simeq 14$.

1441. The authors of [1519] conclude that under their experimental conditions the reaction is heterogeneous.

1442. Obtained using the k of the reaction $CH_3CO \rightarrow CH_3 + CO$, $k = 1.66 \times 10^{10} \exp\left(-\frac{13{,}500}{RT}\right)$, [787, 788].

1443. Obtained assuming that the k of the decay of the CH_3CO radical to $CH_3 + CO$ is expressed by the formula $k = 10^{13}\exp\left(-\frac{18{,}000}{RT}\right)\ sec^{-1}$.

1444. Obtained from the ratio of the k of the given reaction to that of the reaction $CH_3CO \rightarrow CH_3 + CO$, $k = 10^{10.22}\exp\left(-\frac{13{,}500}{RT}\right)$ [1081].

1445. The authors of [678] assume that the complex reaction mechanism proposed in [1517] does not play an appreciable part under their experimental conditions.

1446. The rate constant of the reaction 2 $CH_3CO \rightarrow (CH_3CO)_2$ was taken to be 1.8×10^{13}.

1447. Obtained on the basis of the data of various authors with $k = 10^{14}$ for the reaction 2 $CH_3CO \rightarrow (CH_3CO)_2$.

1448. The difference in E of the reactions $CH_3CO \rightarrow CH_3 + CO$ (1) and $CH_3CO + C_4H_6 \rightarrow C_4H_6CH_3CO$ (2) is $E_1 = E_2 = 8.1$. Taking $E_2 = 5.4$, the authors of [1557] find $E_1 = 13.5$.

1449. The activation energy of the reaction $CH_3CO + O_2 = ?$ was taken to be 0.

1450. Obtained assuming that the E of the reaction of CH_3CO with O_2 is zero.

1451. Calculated by the least-squares method on the basis of [30, 297].

1452. The rate constant of recombination of C_2H_5 was taken to be $10^{13.40}$.

1453. M is a mixture of azoethane and C_2H_5CHO.

1454. Given in [1524] with reference to [1608].

1455. Obtained for $E_p = 0$ from $E = 10 + 1/2\ E_p$, where E_p is the E of recombination of $C_3H_6COC_3H_7$ radicals.

1456. Obtained assuming that the E of the reaction $CH_3CD_2 + CH_3CDCOCD_2CH_3 \rightarrow CH_3CD_2CH_3CDCOCD_2CH_3$ is 0; the E of the reaction $CH_3CD_2 + CH_3CD_2COCD_2CH_3 = CH_3CD_3 + CH_3CDCOCD_2CH_3$ was taken to be 8.7.

1457. According to the reaction mechanism proposed in [201], the tabulated constant is equal to the product of the reaction $Cl_3 + CO = COCl_2 + Cl$ and the equilibrium constant $K = \frac{(Cl_3)}{(Cl_2)^{3/2}}$.

1458. The reaction mechanism of ClO + ClO probably cannot be considered as finally established. See [376].

1459. $\Delta = 0.19\text{–}0.20$.

1460. Obtained on the basis of the measured k ratio and of an estimate of the k of the reactions $C_2Cl_5 + O_2 \rightarrow C_2Cl_5O_2$ and $C_2Cl_5 + C_2Cl_5O_2 \rightarrow C_2Cl_5O_2C_2Cl_5$.

1461. Taking into account the data of [1335], which were obtained from photolysis of $COCl_2$, the author gives

$$\lg \frac{k_1}{k_2} = \lg (30 \pm 5) - \frac{3{,}000 \pm 200}{2.303\ RT},$$

where k_1 is the k of the reaction $COCl + Cl_2 = COCl_2 + Cl$ and k_2 is the k of the reaction $COCl + O_2 = CO_2 + ClO$.

1462. The formula $2 \times 10^{-3} \exp\left(-\frac{6{,}000}{RT}\right)$ was obtained for the k ratio of the given reaction and of the reaction $CF_3CO + Br_2 = CF_3COBr + Br$.

1463. Obtained taking into account the change in paramagnetism of NO with temperature.

1464. It was shown in [302] that the reaction of two NO molecules is, in reality, the reaction $2\ NO = N_2O + O$. See also [893].

1465. Calculated by the least-squares method on the basis of [582, 899, 1629, 1659].

1466. Calculated by the least-squares method on the basis of [582, 899, 1629]. Apparently the reaction $N_2 + O_2 = N_2O + O$ takes place [1629].

1467. See also [1170].

1468. The authors of [40] estimate the accuracy of the pre-exponential factor to a factor of 3.

1469. Calculated by the least-squares method on the basis of [570, 572, 1377].

1470. Calculated from the rate constant of the reverse reaction, measured in [244], and from the equilibrium constant $K = p_{CO}p_{NO_2} : p_{CO_2}p_{NO}$, which can be represented in the range 500-3,000° by the formula $k = 3.964 \exp\left(-\frac{53{,}800}{RT}\right)$.

1471. Given in [1492] for this reaction is a formula with the pre-exponential factors $10^{11.74}$ and $10^{11.70}$. In the latter case, $E = 2.4$.

1472. Obtained under the assumption that the rate of reaction is equal to the rate of NO_2 photolysis.

1473. Calculated by the least-squares method on the basis of [398, 710, 850, 853, 1241, 1242].

1474. Calculated by the least-squares method on the basis of [44, 47].

1475. The ratio of the k of the reaction $NO + ClO = NO_2 + Cl$ to the k of the given reaction was 0.30 ± 0.05.

1476. $\Delta = 0.305$.

1477. $\Delta = 0.17$. See also [1080].

1478. See [883, pp. 175, 176].

1479. See also [773].

1480. Given in [1524] is the formula $k = 10^{18.7} \exp\left(-\frac{47,000}{RT}\right)$ obtained under the assumption that the given reaction is limiting.

1481. Calculated on the basis of the data of [199, 205, 244, 856, 1064, 1414].

1482. Calculated from the data of [193, 244, 1414, 1517]. According to [1517], the constant is essentially the same in the interval 0-65°C. But since the authors of this work found a certain dependence of the constant

$$k = \frac{d(NO_2)}{dt} \frac{1}{(NO)^2(O_2)}$$

on the NO concentration, they assume a more complex mechanism for this reaction, in which NO_3 participates in equilibrium with $NO + O_2$. See also [42, 1506].

1483. See also [1035, pp. 107-112].

1484. See [883, pp. 165-172].

1485. See [1382, pp. 311-320].

1486. According to [1506, 1517], the mechanism of this reaction takes place according to the following scheme:

$$NO + O_2 \rightleftarrows NOO_2^*,$$
$$NOO_2^* + NO \rightleftarrows NOO_2NO^*,$$
$$NOO_2NO^* \rightarrow 2\ NO_2.$$

E = 1.75 is the E of the reaction as a whole.

1487. The authors showed that the given reaction follows the mechanism $2\ NO + O_2 = 2\ NO_2$.

1488. Calculated by the least-squares method on the basis of [244, 254, 411, 630, 678, 1063, 1414].

1489. Obtained on the basis of the data of [927, 961, 1513, 1515, 1516, 1561, 1579].

1490. According to [1579], in the indicated temperature range E increases with T from 3.73 to 9.86. See also [872].

1491. The authors of [961] point out that large errors are inevitable under the experimental conditions of Trautz et al., and as a result their data are hardly reliable. See also [1524, p. 265].

1492. E is ~7.6 in the temperature interval 400-566°.

1493. The authors of [1579] state that the fact that, as they found, the Arrhenius equation is not fulfilled (E increases from 4 to 10 when the temperature increases from -23°C to 300°C) supports Bodenstein's hypothesis [1121] that the reaction takes place according to the mechanism

$$2\ NO = (NO)_2$$
$$(NO)_2 + Cl_2 = 2\ NOCl.$$

1494. See [833, pp. 172-174].

1495. The formula was obtained from the k of the reverse reaction and from K, using the data of [1513, 1515, 1516].

1496. Calculated by the least-squares method on the basis of [47, 961, 1579]. The formula $k = 10^{11.14 \pm 0.29} \exp\left(-\dfrac{5,560 \pm 530}{RT}\right)$ is obtained when [1561] is taken into account. It is not ruled out, however, that the Arrhenius equation need not be fulfilled because of side reactions; see [1524, p. 266].

1497. See [883, p. 174].

1498. The ratio of the k of the given reaction to the k of the reaction $CH_3CONO \rightarrow CH_3CO + NO$ is $10^{2.1 \pm 0.8} \exp\left(\frac{13{,}000 \pm 1{,}000}{RT}\right)$.

1499. The second-order k in the formula $-\frac{d(O_2)}{dt} = k(NO)(O_2)$ was measured. The Arrhenius equation is not fulfilled, which is attributed by the authors to the complicated character of the reaction.

1500. The ratio of the k of the given reaction to the k of the reaction $CH_3CO + NO_2 = CH_3 + CO_2 + NO$ is $10^{0.74} \exp\left(-\frac{2{,}000}{RT}\right)$.

1501. Obtained under the assumption that the k of the reaction $2\ (CH_3)_2N \rightarrow [(CH_3)_2N]_2$ is 10^{14}.

1502. The efficiency of N_2 and O_2 is chosen arbitrarily to be the same as that of Ar.

1503. Calculated using the data of [288, 412].

1504. See also [1563].

1505. The isotope effect of hydrogen (C^{12} and C^{13}) is also studied in [852].

1506. Calculated from the graph.

1507. According to [411], $\frac{k_{800}}{k_{658}} = \frac{85 \pm 2}{1.12 \pm 0.07}$.

1508. Calculated by the least-squares method on the basis of [244, 288, 412, 852, 1488].

1509. Obtained on the basis of the data of [779] and of K.

1510. The authors of [46] point out that the k of the given reaction, determined by them in [45], is accurate to a factor of 2 and that the E of this reaction must be greater than the E of the reaction $2\ NO_2 = 2\ NO + O_2$. They therefore consider the estimate of E (~23) made in [440] to be incorrect.

1511. In view of the large value they obtained for the pre-exponential factor, the authors of [807] state that at high temperatures the reaction probably does not follow Bodenstein's simple scheme $2\ NO_2 = 2\ NO + O_2$.

1512. The sum of the rate constants of the given reaction and the reaction NO_2 + NO_2 = NO_3 + NO is expressed by the formula $9 \times 10^{12} \exp\left(-\frac{25,700}{RT}\right)$.

1513. Calculated by the least-squares method on the basis of [40, 202, 203, 1340].

1514. Calculated indirectly using the equilibrium constant and other data.

1515. The given value of E is the E of the rate of consumption of NO_2 and can agree with the E of the reaction $NO_2 + RH = HNO_2 + R$ only in the initial period.

1516. Obtained from k_- and K. In the opinion of Trotman-Dickenson [1524], E should be close to zero.

1517. The formula $10^{-3.2} \exp\left(\frac{2,300}{RT}\right)$ was obtained for the ratio of the k of the given reaction to the k of the reaction $NO + NO_3 = 2\ NO_2$ at p = 57 mm Hg and the formula $10^{-2.2} \exp\left(\frac{1400}{RT}\right)$ at p = 400 mm Hg.

1518. The k ratio of the reactions $NO_2 + NO_3 \rightarrow N_2O_5$ and $NO + NO_3 = 2\ NO_2$ at 303° is 0.082 for 400 mm Hg and 0.043 for 57 mm Hg; at 313° it is 0.11 for 400 mm Hg and 0.057 for 57 mm Hg.

1519. The change in k is associated by the authors with a change in the reaction mechanism, apparently due to dissociation of NO_2.

1520. Calculated in [807] from the k of the reverse reaction, measured in [573], and from the equilibrium constant.

1521. The sum of the rate constants of the given reaction and of the reaction $O + NO_2 = NO + O_2$ is expressed by the formula $1.2 \times 10^{22} T^{-3/2} \exp\left(-\frac{71,800}{RT}\right)$.

1522. According to [558], the efficiency of O_2 is equal to the efficiency of Ar.

1523. The k ratio of the reactions $NO_3 + CO = NO_2 + CO_2$ and $NO_3 + NO = 2\ NO_2$ is $10^{2.8} \exp\left(-\frac{4,150}{RT}\right)$. The recommended formula was chosen for the k of the latter reaction.

1524. The formula was obtained from K and from the k of the reverse reaction, measured in [573], under the assumption that the latter is proportional to $T^{-3/2}$.

1525. Given with reference to the unpublished work of Schott and Davidson.

1526. Calculated by the least-squares method on the basis of [40, 440, 1377].

1527. The cited formula was obtained for the constant in the equation $\frac{d(HD)}{dt} = k(Ar)^{0.98}(D_2)^{0.66}(H_2)^{0.38}$. Such a reaction rule is explained by the authors of [126] as the "vibrational activation" mechanism, in which the rate of the exchange reaction is determined by the rate of excitation of the molecules entering into the reaction, up to a certain critical level. See also [261].

1528. The formula expresses the sum of the rate constants of the reaction para-H_2 + ortho-H_2 + O_2 and of the reverse reaction.

1529. The values for the constants were chosen so as to get optimum agreement between the calculated and measured induction periods.

1530. See also [488].

1531. According to [1733, 1734], the reaction follows the scheme $H_2 + F_2 = H + HF + F$.

1532. Thermal reaction between iodine and hydrogen, which has been studied by a large number of authors [180, 192, 225, 614, 659, 882, 929, 1034, 1469] (see also [883, 1227, 1382]), was interpreted as the simple bimolecular reaction $H_2 + I_2 = 2\ HI$. In 1955, however, Benson and Srinivasan [155] showed that this reaction is also accompanied by a radical chain reaction, which takes place with the participation of I and H atoms. This reaction mechanism was confirmed experimentally in 1959 by Sullivan [1446].

1533. See [415].

1534. Given in [1435] is $E > 51$.

1535. The data of [1338] were reinterpreted in [1435].

1536. The k ratio of the reactions of H_2 and D_2 with C_2H_4 is 2.5.

1537. The formula was obtained on the basis of the recombination rate constants measured in [602, 828, 983, 1220, 1322, 1375, 1376, 1459] and of K.

1538. The data of [1322, 1374] were used.

1539. The formula is given with reference to Davidson.

1540. The discrepancy between the data of [690, 1436] is explained by the authors of [1436] by the fact that the reaction of atoms was disregarded in [690]. For this reason, the formula in [1436] must be considered as more accurate.

1541. Benson [150] contends that the radical deuterium exchange mechanism is more probable than the molecular mechanism suggested by Bauer.

1542. Given with reference to Byron.

1543. See also [706, 1634, 1737a].

1544. M = O, Ar, NO or O_2.

1545. See also [1410].

1546. Not excluded is the possibility that the reaction being discussed here is the reaction $O_2 + CH_2O = HCOOH + O$ [38].

1547. See also [706].

1548. According to [275], the ratio of the efficiencies of N_2 and O_2 in the temperature interval 2,800-5,000° is 1:4.

1549. Obtained from the constant for M = Ar [303] by multiplication by 9.

1550. Obtained from the constant for M = Ar [303] by multiplication by 3.

1551. Obtained on the basis of [275, 617, 1065, 1716].

1552. The electronically excited CO_2 molecule is believed to originate in the process $CO + O + M = CO_2 + M$.

1553. M = air. See also [706, 1638].

1554. Benson and Axworthy [144] consider the detection of the reaction 2 O_3 = 3 O_2 in [632] to be erroneous, due to the temperature gradient in the reactor.

1555. In the presence of O_2.

1556. In the temperature range 769-910°, the k for M = Ar is lower by a factor of 1.54 ± 0.17 than for M = N_2 [869].

1557. Obtained on the basis of [144, 869, 1660].

1558. Obtained using the data of [632].

1559. The constant depends on the pressure. Given is a value extrapolated to $p = \infty$.

1560. The efficiency of Kr is close to that of Ar.

1561. Obtained using the data of [849]. 5% F_2 + 95% Ar. According to [1386], the efficiency of Kr is somewhat greater than that of Ar. For M = Xe, the reaction takes place according to a complex mechanism, including XeF_2 and, probably, XeF.

1562. 5% F_2 + 75% Ar + 20% Kr.

1563. 10% F_2 + 70% Ar + 20% Kr.

1564. 5% F_2 in Ar. Fluorine is apparently more efficient that argon.

1565. ≤ 1% F_2 in Ne.

1566. 6% F_2 + 94% Ar.

1567. The efficiency of Cl is 10 times greater than that of Ar.

1568. Mixture of CH_4 + Cl_2 in Ar.

1569. M = 0.25 Cl_2 + 0.75 Ar.

1570. $M = 0.2\ Cl_2 + 0.8\ Ar$ and $0.25\ Cl_2 + 0.75\ Ar$. Measurements in $0.04\ Cl_2 + 0.96\ Ar$ [775] show that the efficiencies of Cl_2 and Ar are essentially the same.

1571. The hypothesis is made in [317] that the large values of k measured in [775], which differ by one order from the data of [317, 827, 1542], may be due to photodissociation of Cl_2. See also [1542].

1572. $M = 0.05\ Cl_2 + 0.95\ Ar$.

1573. $M = 0.02\ Cl_2 + 0.98\ Ar$.

1574. $M = 0.005\ Cl_2 + 0.990\ Ar + 0.005\ Kr$.

1575. This formula, accurate to 30%, represents the data obtained in [462]. In the opinion of the authors of this reference, the failure to fulfill the rule of the classical collision theory for the number of degrees of freedom possible for a diatomic molecule must, perhaps, be attributed to the fact that the Boltzmann energy distribution is not fulfilled when the reaction takes place at high temperature.

1576. Doubts are raised in [1542] as to the reliability of application of the mass-spectrometry method in [462].

1577. $(Cl_2) : (Ar) = 1 : 5$.

1578. Obtained on the basis of [317, 827, 1542]. Extrapolation to T = 298° and calculation of the k of recombination by the formula $k_p = \frac{k_D}{K}$ (K taken from [1766]) yields $k_p = 10^{16.0}$. The measured value of the k of the reaction $Cl + Cl + Ar = Cl_2 + Ar$ at room temperature is, according to [380, 812], $10^{15.63}$.

1579. The data of Willard et al. were used for the k of recombination of Br atoms, measured at temperatures from room to ~430°. See also [305].

1580. $M = 0.05\ Br_2 + 0.95\ Ar$.

1581. Measured is the k of dissociation of Br_2 in He, Ar, N_2, CO, O_2 and CO_2; the values of the k of recombination, calculated in terms of K, are listed.

1582. The k of dissociation of bromine in mixtures with argon was measured; the values of the k of recombination, calculated in terms of K, are listed.

1583. The tabulated value of A was calculated under the assumption that the activation energy of the recombination process is zero [1524]. The recombination rate constants were measured at 293°.

1584. Indicated in [1520] is the observed transition from second to first order upon the dissociation of iodine in argon.

1585. Calculated from the k of recombination, measured at room temperature, assuming that it does not depend on the temperature.

1586. The k of dissociation of iodine in He, Ar, N_2, O_2 and CO_2 was measured; given is the k of recombination, calculated in terms of K.

1587. See also [183].

1588. M is argon with small admixtures of HF, H_2 and F_2. In the case of mixtures that do not contain fluorine, a somewhat more accurate formula is $k = 10^{22.4}T^{-2}\exp\left(-\frac{134,100}{RT}\right)$.

1589. According to [826], a formula with a smaller E is more accurate.

1590. The authors of [1385] note that the previous formula gives a better description of their experimental data.

1591. See [883, pp. 149-151].

1592. Trotman-Dickenson [1524, p. 259] indicates the excessively high value obtained in [1192] for the pre-exponential factor and gives a corrected value, stating, however, that it is not particularly accurate.

1593. See also [1080].

1594. According to [180], within the limits of the measurement error (± 0.5) the E of the reactions $2\ DI = D_2 + I_2$ and $2\ HI = H_2 + I_2$ are equal; the ratio of the pre-exponential factor is $A_D : A_H = 1 : 1.57$. For the reverse reactions, $A_{D-} : A_{H-} = 1 : 1.95$.

1595. The ratio of the k of the given reaction to the k of the reaction $HI + CH_3I = I_2 + CH_4$ is 1 : 1.42.

1596. p = I - 22.4 atm.

1597. Given in [1289, 1290] as the recommended formula.

1598. Given is a summary of all the known data for M = Ar and N_2.

1599. Calculated on the basis of [444, 445, 556, 1201].

1600. Calculated by the least-squares method on the basis of [444, 556].

1601. According to [1197], the k in the given case is a complex quantity obtained from the reaction mechanism of [609] under the assumption of fixed concentrations of SO_3 and electronically excited SO_2.

1602. In view of the fact that the true activation energy turns out to be 74 if it is assumed that four harmonic vibrations participate in the activation of the molecule, which is the same as the excitation energy of the triplet state of SO_2, the authors conclude that the constant they measured is the rate constant of excitation. The excited molecule then reacts according to the scheme $SO_2' + SO_2 = SO_3 + SO$.

1603. See also [999].

1604. E = 71.5 was chosen arbitrarily.

1605. The given formula is, apparently, the doubled k. See [1201].

1606. The authors conclude that a formula intermediate between the two formulas given by them must be considered to be more correct.

1607. This formula contradicts the preceding formula and must probably be replaced by the formula $k = 10^{20.85}T^{-3/2}\exp\left(-\frac{117{,}600}{RT}\right)$.

1608. According to the data of a number of authors, the relative efficiencies of various M are:

M =	N_2	O_2	Ar	He	CO_2	H_2O	H_2O_2	Reference
	1	0.71	-	0.53	1.24	4.3	5.9	[785]
	1	0.78	0.67	-	-	6.0	6.6	[84]
	1	(0.78)	-	0.57	-	6.0	5.4	[576]

$O_2 : N_2 = 0.78 : 1$ was chosen arbitrarily in [576].

1609. Obtained on the basis of the data of [84, 624, 785, 1078, 1354].

1610. Obtained on the basis of the data of [624, 785, 1078, 1354]. Referring to the reaction mechanism, the authors of [785] took 1/2 the measured efficiency of k for the k given by them.

1611. It was shown in [785] that the contradictory results of [624, 1078, 1354] can be placed in complete agreement with the results of this study if the furface reaction is taken into account in an appropriate manner and if the data obtained in these references are recalculated for a reaction whose rate is proportional to the product (M) (H_2O_2).

1612. According to [1354], the decomposition rates of H_2O_2 and D_2O_2 are the same if the conditions are the same.

1613. According to [624], D_2O_2 decomposes at the same rate as H_2O_2. See also [1354].

1614. The data of [1561] are corrected in [47] with allowance for radical reaction, which is appreciable when $T > 450°$.

1615. See also [448].

1616. The data of [1561] were also used in obtaining this formula.

1617. Calculated from the k of the reverse reaction [961] and from the equilibrium constant [446].

1618. See [1382, pp. 291-293].

1619. The ratio of the rate constants of the reactions of B_2H_6 with $(CH_3)_3N$, $(CH_3)_2PH$ and $(CH_3)PH_2$ is 8 : 5 : 1.

1620. See [1382, pp. 290-291].

1621. See [1382, pp. 299-301].

1622. Not excluded is the possibility that the given reaction equation is a stoichiometric equation.

1623. The authors point out that the E of this reaction is infinitesimal. The formula $10^{13}/k = 12.6 + 1.16/p$ (p in mm Hg) is given for k as a function of pressure.

1624. The activation energy of this reaction is infinitesimal. The formula $10^{13}/k = 0.31 + 0.444/p$ (p in mm Hg) is given for k.

1625. The activation energy of this reaction is infinitesimal. The formula $10^{13}/k = 2.68 + 0.041/p$ (p in mm Hg) is given for k.

1626. The ratio of the k of the given reaction to the square root of the k of the reaction $2\ CF_2O_2 = 2\ CF_2O + O_2$ is 3.1 at 296° and about 6.3 at 398°. See also [746].

1627. The ratio of the square of k of the reaction $RO_2 + C_3F_6 = 2\ RO + R'$ to the k of the reaction $2\ RO_2 = 2\ RO + O_2 \geq 4.4$. R and R' = CF_2 or CF_3CF.

1628. The ratio of the k of the given reaction to the k of the reaction $CF_2O_2 = CF_2O + C_2F_4O$ is 0.5 at 296° and 1.1-2.0 at 398°.

1629. The rate constant of the reaction $O' + O_2 = O + O_2$ was taken to be $10^{9.38}$ [808].

1630. Given is the ratio of the k of the given reaction to the k of the reaction $O' + O_2 + M = O_3 + M$, multiplied by (M), equalling 41. See, however, [1365].

1631. The rate constant of the given reaction is lower by a factor of 4 ± 1 than the k of the reaction $O' + O_3 = 2\ O_2$.

1632. The authors of [1643] believe that $O'(^1S)$ is possibly the excited O atom.

1633. The rate of the reaction of O' with C_2H_4 is faster by a factor of 300 than that with C_2H_6.

1634. $k = 10^{19}$ if the reaction takes place according to the scheme $O'(^1D) + CO + CO_2 = CO_2 + CO_2$.

1635. The ratio of the k of the given reaction to the k of the reaction $O'(^1D) + CO_2 \rightarrow CO_3$ is 55 ± 5.

1636. Calculated from the measured ratio of the k of the reaction $O'(^1D) + O'(^1D) + CO_2 = O_2 + CO_2$ to the square of the k of the given reaction (7.8×10^3 sec), assuming that the k of the first reaction is equal to the k of the reaction $O + O + CO_2 = O_2 + CO_2$, measured in [1311].

1637. Obtained from the measured k ratio of the reactions $O'(^1D) + CO \rightarrow CO_2$ and $O'(^1D) + CO_2 \rightarrow CO_3$ with $k = 10^{12.78}$ for the first reaction.

1638. The k ratio of the reaction $S' + COS = S_2 + CO$ and the given reaction is 1.4-2.2.

1639. The ratio of the k of the reaction $S' + COS = S_2 + CO$ to the k of the given reaction is 1.9.

1640. The ratio of the k of the reaction $S' + COS = S_2 + CO$ to the k of the given reaction is 2.0.

1641. Cl' and Cl_2' denote $Cl(^2P_{1/2})$ and $Cl_2(^3\Pi_0^+)$, respectively.

1642. Obtained from the measured k ratio, taking the k of the process $I' + C_3H_8 = I + C_3H_8$ to be 3.43×10^{10} at 30°C [481].

1643. The constant is the sum of the k of the given reaction and of the process $I'(5^2P_{1/2}) + CH_3I = I(5^2P_{3/2}) + CH_3I$. From a comparison with the k measured in [1114] the authors of [478] conclude that the ratio of these constants is $\simeq 10^{-2}$ at 300°.

1644. The ratio of the k of the given reaction to the k of the reaction $Hg' + N_2O = Hg + N_2 + O$ is 0.31. See also [1647].

1645. The ratio of the total k of the reactions $NO' + NO = 2\,NO$, $N_2 + O_2$, $N_2O + O$ to the k of the given reaction is 100 : 32.

1646. The given reaction is faster than the reaction of NO' with NO and does not depend on the temperature.

1647. The ratio of the total k of the reactions $NO' + NO = 2\ NO$, $N_2 + O_2$, $N_2O + O$ to the k of the given reaction is 100 : 86.

1648. The ratio of the total k of the reactions $NO' + NO = 2\ NO$, $N_2 + O_2$, $N_2O + O$ to the k of the given reaction is 2.45 at 296° and 0.67 at 468°.

1649. The k ratio of the reactions $O_2' + O_3 = O_2 + O_2 + O$ and $O + O_3 = 2\ O_2$ is 1.7.

1650. The ratio of the k of the given reaction to the k of the reaction $CH_2' + CH_2CO \rightarrow$ products is 0.14 ± 0.02 and to the k of the reaction CH_2' + trans-$C_4H_8 \rightarrow C_5H_{10}$ is 0.10 ± 0.02.

1651. The ratio of the k of the given reaction to the k of the reaction $^1CH_2'$ + iso-$C_4H_8 \rightarrow C_5H_{10}$ is 0.51 ± 0.01.

1652. The ratio of the k of the given reaction to the k of the reaction $^1CH_2'$ + iso-$C_4H_8 \rightarrow C_5H_{10}$ is 0.65 ± 0.01.

1653. The ratio of the k of the given reaction to the k of the reaction $^1CH_2'$ + iso-$C_4H_8 \rightarrow C_5H_{10}$ is 0.83 ± 0.02.

1654. See also [490].

1655. The ratio of the k of the given reaction to the k of the reaction $^1CH_2'$ + iso-$C_4H_8 \rightarrow C_5H_{10}$ is 0.70 ± 0.03.

1656. The ratio of the k of the given reaction to the k of the reaction $^1CH_2'$ + iso-$C_4H_8 \rightarrow C_5H_{10}$ is 0.71 ± 0.08.

1657. The ratio of the k of the given reaction to the k of the reaction $^1CH_2'$ + iso-$C_4H_8 \rightarrow C_5H_{10}$ is 1.08 ± 0.08.

1658. The ratio of the k of the given reaction to the k of the reaction $^1CH_2'$ + iso-$C_4H_8 \rightarrow C_5H_{10}$ is 1.10 ± 0.10.

1659. The ratio of the k of the given reaction to the k of the reaction $^1CH_2'$ + iso-$C_4H_8 \rightarrow C_5H_{10}$ is 2.01 ± 0.06.

1660. The ratio of the k of insertion into the C-H bond to the k of the reaction of attachment to the double bond is ~0.09.

1661. The ratio of the k of the given reaction to the total k of the reaction of CH_2' with C_2H_5Cl is greater than 16.3.

1662. The ratio of the k of the given reaction to the k of the reaction $CF_2' + CF_2O_2 = C_2F_4 + O_2$ is about 1.

1663. According to [714] this constant is the constant of recombination of NH_2 radicals. But in view of the fact that at such low pressure as 0.4-0.8 mm Hg the constant turns out to be independent of the pressure, it should probably be considered as a constant of disproportionation [457].

1664. The authors note that up to 7.6% H_2 was obtained in [37], whereas the percentage of H_2 in the given reference was less than 0.3.

1665. The k ratio of the reactions $CH_3 + O_2 + M = CH_3O_2 + M$ and $CH_3 + O_2 = HCHO + OH$, measured at 473° and 523°, is $10^{2.41} \exp\left(\frac{18,300}{RT}\right)$.

1666. Measured was the k ratio of the reactions $O + O_3 = 2\ O_2$ and $O + O_2 + O_2 = O_3 + O_2$ ($10^{5.30}$).

1667. Obtained from the measured ratio of the k of the given reaction to the k of the reaction $H + O_2 + M = HO_2 + M$ $(0.193 \pm 0.019)10^{-3}$; the k of the latter reaction was taken to be $10^{15.96}$. The activation energy was determined using the calculated pre-exponential factor [1712].

1668. Also calculated in [1394a] were the k of the reactions $H + T_2 = HT + T$, $D + T_2 = DT + T$, $T + H_2 = HT + H$ and $T + D_2 = DT + D$ for 200-1250°.

1669. Also given in [1655a] is the sum of the k of the given reaction and the reaction $O + NO + M = NO_2 + M$.

1670. Obtained from the measured k ratio of the given reaction and the reaction iso-$C_3H_7 \rightarrow H + C_3H_6$ and from the k of the latter reaction, $k = 10^{15.0} \times \exp\left(-\frac{42,000}{RT}\right)$; k was taken from the data of a number of authors.

1671. The ratio of the k of the given reaction to the k of the reaction $O + N_2O = O_2 + N_2$ does not depend on the temperature; it is 1.2 ± 0.2.

1672. The ratio of the k of the given reaction to the k of the reaction $Cl + C_2H_3Cl_2 \rightarrow$ products is $10^{4.4} \exp\left(\frac{7,500}{RT}\right)$. Given in [804] with reference to [106, 107, 108, 803].

1673. The authors of [1357] do not rule out the possibility that the first step in the reaction of O with C_2F_4 is the formation of the complex C_2F_4O. The ratio of the k of this reaction to the k of the reaction $O + C_2H_4 \rightarrow C_2H_4O$ is 1.03 (296°0).

1674. See also [1261]. $\Delta = 0.19$-0.20 was obtained in this reference. $\Delta = 0.06$ is given for the reaction $CFH_2 + CF_2H = CFH_3 + CF_2$.

1675. See also [1382].

1676. lg k has been corrected.

1677. See also [1664].

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This section provides a tabulation of equilibrium constants for a number of reactions. These constants can be used to derive reverse reaction rates from a measurement of a forward rate and the definition of the equilibrium constant as the ratio of the forward to reverse rates.

The JANNAF (Joint Army, Navy, NASA, Air Force) Thermochemical Tables* provided the basic data from which the equilibrium constants were calculated. These tables provide critically chosen values of heat capacity, entropy, enthalpy and free energy for most common species tabulated at 100°K increments over a 6000°K range.

We have calculated equilibrium constants for reactions covered by the present compilation wherever JANNAF data were available. The first column lists the page on which the rate information can be found. The second column gives the reaction as written. Columns three through seven provide equilibrium constants calculated from the JANNAF data. Columns eight and nine give a least squares fit of the calculations to the Arhennius form.** This form provides a convenient approximation for many purposes, but it is not a perfect representation. Where the fit of K deviated more than 5% from the tabular data the entry was starred to caution the user. Where the fit deviated more than 50% a double star warning is posted.

* JANNAF Thermochemical Tables
Available through the National Technical Information Service, U.S. Department of Commerce, Springfield, Va. 22151. (Report PB-168-370 with addenda PB-168-370-1 and PB-168-370-2) (A revised edition incorporating the addenda and revised through 1970 is scheduled for publication during 1971). The data used in constructing these tables utilized the revised tables through supplement 34 (Dec. 1970) and should be consistent with values in the new edition.

** $K = A \exp(1000\ E/RT)$
In this equation A is the frequency factor ratio (dimensionless); E is the enthalpy change (kilocalories per mole); R is the universal gas constant (calories per mole-degree) and T is temperature (degrees Kelvin).

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
11	$H + O_2 = OH + O$	-11.047	-6.104	-2.421	-1.228	-0.647	1.225	-16.822	
12	$H + O_3 = OH + O_2$	57.717	35.347	18.444	12.717	9.817	1.468	77.301	*
12	$H + OH = H_2 + O$	1.133	0.540	0.099	-0.050	-0.129	-0.348	2.033	
12	$H + H_2O = H_2 + OH$	-10.499	-6.050	-2.676	-1.558	-1.009	0.671	-15.343	
13	$H + HO_2 = OH + OH$	29.074	17.982	9.627	6.783	5.333	1.206	38.295	*
13	$H + HO_2 = H_2 + O_2$	41.254	24.626	12.147	7.961	5.851	-0.367	57.150	
13	$H + H_2O_2 = H_2 + HO_2$	11.170	6.913	3.648	2.506	1.916	0.342	14.913	*
13	$H + H_2O_2 = H_2O + OH$	50.743	30.945	15.951	10.847	8.258	0.877	68.551	*
13	$H + H_2S = H_2 + HS$	9.496	5.851	3.144	2.216	1.731	0.388	12.507	
13	$H + F_2 = HF + F$	72.453	43.776	22.201	14.952	11.302	0.576	98.719	*
14	$H + Cl_2 = HCl + Cl$	33.704	20.496	10.513	7.145	5.447	0.508	45.615	*
14	$H + Br_2 = HBr + Br$	30.906	18.783	9.574	6.458	4.890	0.354	42.001	*
14	$H + I_2 = HI + I$	26.258	15.958	8.116	5.455	4.112	0.261	35.749	*
14	$H + ClF = HF + Cl$	55.825	33.611	16.887	11.265	8.433	0.125	76.507	*
14	$H + ClF = HCl + F$	32.122	19.531	10.019	6.804	5.180	0.476	43.486	*
14	$H + HF = H_2 + F$	-23.191	-13.886	-6.885	-4.546	-3.376	0.114	-32.001	
15	$H + HCl = H_2 + Cl$	0.512	0.194	-0.017	-0.085	-0.123	-0.238	1.020	
15	$H + HBr = H_2 + Br$	11.726	6.873	3.228	2.000	1.382	-0.432	16.697	
15	$H + HI = H_2 + I$	23.425	13.848	6.652	4.229	3.004	-0.573	32.959	
15	$H + ClO = OH + Cl$	27.986	16.940	8.604	5.784	4.357	0.234	38.134	*
15	$H + ClO = HCl + O$	28.607	17.286	8.720	5.819	4.351	0.124	39.147	*
15	$H + Cl_2O = ClOH + Cl$	49.211	29.871	15.220	10.271	7.775	0.542	66.890	*
15	$H + CO_2 = OH + CO$	-15.473	-8.189	-2.835	-1.149	-0.353	2.428	-24.490	*
15	$H + CO_2 = O + CHO$	-78.537	-45.947	-21.590	-13.527	-9.521	2.725	-111.497	*
15	$H + NH_3 = H_2 + NH_2$	1.706	1.425	1.233	1.136	1.058	0.982	1.004	

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
16	$H + N_2H_4 = NH_3 + NH_2$	35.127	21.744	11.476	7.892	6.025	1.081	46.892	**
16	$H + N_2O = OH + N_2$	47.446	29.299	15.557	10.868	8.474	1.721	62.865	*
16	$H + N_2O = NH + NO$	-19.492	-10.515	-3.899	-1.786	-0.773	2.638	-30.295	*
16	$H + NO_2 = OH + NO$	23.155	14.722	8.324	6.118	4.984	1.857	29.295	*
16	$H + HNO = H_2 + NO$	39.884	24.068	12.196	8.201	6.181	0.275	54.395	
16	$H + HNO = OH + NH$	-9.088	-4.824	-1.656	-0.657	-0.186	1.446	-14.424	*
16	$H + ClNO = HCl + NO$	48.425	29.451	15.053	10.156	7.666	0.591	65.767	*
17	$H + CH_4 = H_2 + CH_3$	0.798	1.039	1.313	1.384	1.390	1.513	-1.003	
19	$H + C_2H_2 = H_2 + C_2H$	-4.447	-2.204	-0.585	-0.115	0.079	0.961	-7.368	*
20	$H + CHO = H_2 + CO$	64.197	38.298	18.854	12.328	9.039	-0.645	89.040	*
20	$H + CH_2O = H_2 + CHO$	11.339	7.296	4.302	3.271	2.725	1.241	13.866	
21	$H + CH_3F = HF + CH_3$	20.831	13.177	7.446	5.467	4.431	1.612	26.414	*
21	$H + CHF_3 = H_2 + CF_3$	-0.414	0.232	0.738	0.869	0.901	1.177	-2.172	
21	$H + CF_4 = HF + CF_3$	8.083	6.130	4.510	3.856	3.474	2.796	7.365	*
21	$H + CH_3Cl = HCl + CH_3$	15.281	9.860	5.754	4.310	3.546	1.559	18.887	*
22	$H + CHCl_3 = H_2 + CCl_3$	7.044	4.614	2.797	2.145	1.785	0.910	8.442	*
22	$H + CCl_3 = HCl + CCl_2$	28.469	17.869	9.723	6.912	5.486	1.536	37.081	*
22	$H + CCl_4 = HCl + CCl_3$	26.565	17.101	9.768	7.198	5.862	2.361	33.365	*
22	$H + CCl_3F = HF + CCl_3$	23.711	15.144	8.534	6.207	4.988	1.831	30.158	*
22	$H + CBrF_3 = HBr + CF_3$	15.868	10.517	6.275	4.742	3.926	1.965	19.220	*
26	$H + H + M = H_2 + M$	70.754	40.316	17.292	9.512	5.580	-5.794	105.197	*
26	$H + N + M = NH + M$	56.711	32.141	13.520	7.217	4.029	-5.151	85.032	*
27	$H + F + M = HF + M$	93.945	54.202	24.177	14.058	8.956	-5.907	137.199	*
27	$H + Cl + M = HCl + M$	70.242	40.122	17.309	9.597	5.703	-5.556	104.178	*
27	$H + Br = HBr + M$	59.028	33.443	14.064	7.512	4.198	-5.362	88.501	*

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
27	$H + OH + M = H_2O + M$	81.253	46.366	19.968	11.070	6.589	-6.465	120.540	*
28	$H + CO + M = CHO + M$	6.557	2.018	-1.562	-2.816	-3.459	-5.149	16.157	*
28	$H + NO = HNO$	30.870	16.248	5.096	1.311	-0.601	-6.069	50.802	*
30	$H + O_2 + M = HO_2 + M$	29.500	15.690	5.145	1.551	-0.271	-5.427	48.047	*
30	$H + CH_3 \rightarrow CH_4$	69.956	39.277	15.979	8.128	4.190	-7.307	106.200	*
34	$H + CF_3 + M = CHF_3 + M$	71.168	40.084	16.554	8.643	4.679	-6.971	107.370	*
40	$Na + Cl_2 = NaCl + Cl$	30.230	18.535	9.809	6.919	5.480	1.089	39.979	
40	$Na + Br_2 = NaBr + Br$	30.612	18.725	9.815	6.853	5.381	0.916	40.758	
40	$Na + HCl = NaCl + H$	-3.474	-1.961	-0.704	-0.226	0.033	0.581	-5.636	*
40	$Na + HBr = NaBr + H$	-0.294	-0.058	0.241	0.395	0.491	0.562	-1.243	*
40	$Na + CH_3F = FNa + CH_3$	5.009	3.820	3.053	2.797	2.650	2.228	3.777	*
40	$Na + CF_4 = FNa + CF_3$	-7.739	-3.227	0.117	1.186	1.693	3.412	-15.272	*
41	$Na + CH_3Cl = NaCl + CH_3$	11.807	7.899	5.050	4.084	3.579	2.140	13.251	
41	$Na + CCl_4 = NaCl + CCl_3$	23.091	15.140	9.064	6.972	5.895	2.942	27.729	*
45	$Na + C_2N_2 = NaCN + CN$	-16.955	-9.115	-3.289	-1.399	-0.483	2.486	-26.645	*
45	$Na + CClN = NaCl + CN$	0.817	1.361	1.686	1.732	1.721	1.957	-1.506	*
45	$Na + CClN = NaCN + Cl$	6.265	4.178	2.671	2.185	1.940	1.159	6.983	
45	$Na + CBrN = BrNa + CN$	2.657	2.445	2.193	2.042	1.934	1.887	1.121	*
46	$Na + CCl_2O = NaCl + CClO$	25.998	16.817	9.878	7.511	6.298	2.885	31.773	*
51	$Na + N_2O = NaO + N_2$	20.935	13.563	8.019	6.130	5.161	2.423	25.437	*
51	$Na + NO_2 = NaO + NO$	-3.356	-1.014	0.786	1.380	1.671	2.559	-8.132	
51	$Na + ClHg = NaCl + Hg$	52.869	31.532	15.525	10.187	7.518	-0.483	73.241	
51	$Na + Cl_2Hg = NaCl + ClHg$	13.372	8.844	5.334	4.103	3.461	1.787	15.971	*
51	$Na + BCl_3 = NaCl + BCl_2$	-2.222	-0.143	1.340	1.776	1.965	2.773	-6.804	*
51	$Na + BBr_3 = BrNa + BBr_2$	0.366	1.399	2.078	2.242	2.294	2.710	-3.155	*

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
51	$Na + Cl_4Si = NaCl + Cl_3Si$	8.229	6.243	4.651	4.057	3.729	3.013	7.226	*
51	$Na + Cl_4Ti = NaCl + Cl_3Ti$	13.361	8.771	5.248	4.034	3.408	1.703	16.050	*
53	$K + HCl = ClK + H$	-0.780	-0.285	0.212	0.439	0.572	0.738	-2.155	*
53	$K + HBr = BrK + H$	2.904	1.920	1.306	1.158	1.102	0.716	2.935	*
53	$K + HI = IK + H$	4.331	2.774	1.725	1.426	1.291	0.693	4.930	*
54	$N + H_2 = NH + H$	-14.043	-8.175	-3.772	-2.295	-1.551	0.643	-20.166	
54	$N + O_2 = NO + O$	23.882	14.613	7.659	5.335	4.169	0.697	31.831	
54	$N + Br_2 = BrN + Br$	16.439	10.092	5.305	3.708	2.913	0.529	21.850	
54	$N + BrI = BrN + I$	18.649	11.255	5.677	3.810	2.872	0.101	25.477	
55	$N + HBr = NH + Br$	-2.317	-1.302	-0.544	-0.295	-0.169	0.212	-3.469	
55	$N + ClO = NO + Cl$	62.915	37.657	18.684	12.347	9.173	-0.294	86.787	
55	$N + OH = NO + H$	34.929	20.717	10.080	6.563	4.816	-0.528	48.653	
55	$N + HO_2 = NH + O_2$	27.211	16.451	8.375	5.666	4.300	0.277	36.985	
55	$N + NO = N_2 + O$	54.028	32.179	15.783	10.309	7.567	-0.622	75.028	
55	$N + N_2O = NO + N_2$	82.375	50.016	25.637	17.431	13.290	1.193	111.518	*
55	$N + NO_2 = N_2O + O$	29.737	17.602	8.550	5.559	4.077	-0.485	41.458	
55	$N + NO_2 = NO + NO$	58.084	35.439	18.404	12.681	9.800	1.330	77.948	*
55	$N + NO_2 = N_2 + O_2$	88.230	53.005	26.528	17.655	13.198	0.011	121.145	*
56	$N + NO_2 = N_2 + O + O$	7.562	7.125	6.914	6.865	6.842	6.682	1.158	*
56	$N + HNO = N_2O + H$	45.333	26.408	12.323	7.692	5.403	-1.720	64.525	*
56	$N + HNO = NH + NO$	25.841	15.893	8.424	5.906	4.630	0.918	34.229	
56	$N + CO_2 = NO + CO$	19.456	12.528	7.245	5.414	4.463	1.900	24.163	*
56	$N + O_3 = NO + O_2$	92.646	56.064	28.524	19.280	14.633	0.941	125.954	*
56	$N + CH_3 = CHN + H + H$	12.590	9.409	7.290	6.700	6.442	5.215	9.979	*
56	$N + CH_3 = CHN + H_2$	83.344	49.725	24.582	16.212	12.022	-0.579	115.177	

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10 (KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
57	$N + C_2H_4 = CHN + CH_3$	43.748	26.789	14.107	9.839	7.673	1.349	58.210	
61	$N + N + M = N_2 + M$	158.578	92.672	43.056	26.434	18.092	-6.595	226.845	*
62	$N + O + M = NO + M$	104.550	60.493	27.273	16.125	10.525	-5.974	151.817	*
63	$N + H_2 + M = NH_2 + M$	48.438	27.104	10.882	5.393	2.625	-5.356	73.960	*
63	$N + CN + M = CN_2 + M$	68.961	38.635	15.879	8.320	4.556	-6.835	104.041	
64	$O + H_2 = OH + H$	-1.133	-0.540	-0.099	0.050	0.129	0.348	-2.033	
64	$O + OH = O_2 + H$	11.047	6.104	2.421	1.228	0.647	-1.225	16.822	
65	$O + HO_2 = OH + O_2$	40.121	24.086	12.048	8.011	5.980	-0.019	55.117	
65	$O + H_2O = OH + OH$	-11.632	-6.590	-2.775	-1.508	-0.880	1.019	-17.376	
65	$O + H_2S = OH + HS$	8.363	5.311	3.045	2.266	1.860	0.735	10.474	
65	$O + H_2O_2 = OH + HO_2$	10.037	6.373	3.549	2.556	2.045	0.690	12.880	*
65	$O + CO_2 = O_2 + CO$	-4.426	-2.085	-0.414	0.079	0.294	1.203	-7.668	*
65	$O + C_3O_2 = CO + CO + CO$	92.945	58.988	33.300	24.569	20.119	7.469	117.494	**
65	$O + C_3O_2 = CO_2 + C_2O$	46.202	27.874	13.994	9.301	6.930	0.080	63.390	*
65	$O + COS = OS + CO$	38.745	23.778	12.429	8.566	6.597	1.021	51.867	*
65	$O + CS_2 = OS + CS$	24.261	15.210	8.287	5.905	4.680	1.317	31.578	*
65	$O + N_2 = NO + N$	-54.023	-32.179	-15.783	-10.309	-7.567	0.622	-75.028	
66	$O + NO = O_2 + N$	-23.882	-14.613	-7.659	-5.335	-4.169	-0.697	-31.831	
66	$O + N_2O = O_2 + N_2$	58.493	35.403	17.978	12.096	9.121	0.496	79.687	*
66	$O + N_2O = NO + NO$	28.347	17.837	9.854	7.122	5.723	1.815	36.490	*
66	$O + NO_2 = O_2 + NO$	34.202	20.826	10.745	7.346	5.631	0.632	46.117	
67	$O + HNO = HO_2 + N$	-25.252	-15.171	-7.610	-5.095	-3.839	-0.056	-34.586	
67	$O + HNO = NO_2 + H$	15.596	8.806	3.773	2.133	1.326	-1.235	23.067	
67	$O + HNO = O_2 + NH$	1.959	1.280	0.765	0.571	0.461	0.221	2.399	
67	$O + HNO = OH + NO$	38.751	23.528	12.097	8.251	6.310	0.623	52.362	

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
67	$O + HNO_3 = OH + NO_3$	1.163	0.889	0.673	0.567	0.489	0.411	1.053	
67	$O + O_3 = O_2 + O_2$	68.764	41.451	20.865	13.945	10.464	0.243	94.123	*
67	$O + O_3S = O_2 + O_2S$	28.018	17.526	9.548	6.819	5.426	1.521	36.444	*
67	$O + Cl_2 = ClO + Cl$	5.097	3.210	1.793	1.326	1.096	0.384	6.467	
68	$O + ClO = O_2 + Cl$	39.033	23.044	11.025	7.012	5.004	-0.992	54.956	
68	$O + ClO_2 = O_2 + ClO$	44.680	27.069	13.782	9.306	7.050	0.464	60.746	*
68	$O + Cl_2O = ClO + ClO$	24.705	15.293	8.142	5.718	4.495	0.976	32.623	*
68	$O + HCl = OH + Cl$	-0.621	-0.346	-0.116	-0.035	0.006	0.110	-1.013	
68	$O + NH = OH + N$	12.910	7.635	3.673	2.345	1.680	-0.296	18.133	
68	$O + NH = NO + H$	47.839	28.352	13.753	8.908	6.496	-0.823	66.786	
68	$O + NH_2 = OH + NH$	7.140	4.497	2.539	1.874	1.533	0.554	9.039	
68	$O + NH_3 = OH + NH_2$	0.573	0.885	1.134	1.186	1.187	1.330	-1.029	
68	$O + NH_3 = H_2O + NH$	19.345	11.972	6.448	4.568	3.600	0.865	25.386	
68	$O + NH_3 = H_2 + HNO$	17.934	10.746	5.428	3.667	2.777	0.090	24.467	
69	$O + CN = CO + N$	55.438	32.992	16.147	10.527	7.716	-0.700	77.069	
69	$O + CH_2 = CO + H + H$	58.225	36.803	20.934	15.709	13.108	5.066	72.878	*
69	$O + CH_3 = CH_2O + H$	49.842	29.429	14.100	9.011	6.481	-1.191	70.053	
69	$O + CH_4 = OH + CH_3$	-0.335	0.499	1.214	1.434	1.519	1.861	-3.036	
70	$O + C_2H_4 = CH_3 + CHO$	21.585	13.789	7.927	5.909	4.857	1.978	26.952	*
71	$O + C_2H_2 = CO + CH_2$	35.908	21.853	11.162	7.518	5.661	0.423	48.802	*
72	$O + CHO = OH + CO$	63.064	37.758	18.755	12.378	9.168	-0.297	87.007	*
72	$O + CH_2O = OH + CHO$	10.206	6.756	4.203	3.321	2.854	1.589	11.833	
73	$O + CCl_4 = CCl_2O + Cl_2$	66.875	40.797	21.023	14.329	10.942	1.199	90.279	*
73	$O + CCl_4 = CO + Cl_2 + Cl_2$	54.945	36.512	22.426	17.571	15.073	8.229	64.294	**
73	$O + C_2F_4 = CF_2O + CF_2$	73.672	44.917	23.118	15.730	11.980	1.247	99.560	*

REF PAGE	REACTION	Equilibrium log10(KP), Temperature (K): 300	500	1000	1500	2000	Fit of A*EXP(1000*E/RT): LOG10(A)	E	
75	$O + O + M = O_2 + M$	80.668	45.880	19.614	10.790	6.356	-6.671	119.987	*
75	$O + OH = HO_2 + O_2$	40.547	21.794	7.566	2.779	0.376	-6.652	64.869	*
76	$O + CO + M = CO_2 + M$	85.094	47.965	20.028	10.711	6.062	-7.874	127.655	*
78	$O + NO + M = NO_2 + M$	46.466	25.054	8.869	3.444	0.725	-7.303	73.869	*
80	$O + O_2 + M = O_3 + M$	11.904	4.429	-1.251	-3.155	-4.108	-6.915	25.864	
81	$O + O_2S + M = O_3S + M$	52.650	28.354	10.066	3.971	0.930	-8.192	83.543	
81	$O + NO_2 + M = NO_3 + M$	29.015	14.262	3.175	-0.495	-2.312	-7.866	50.623	
81	$O + C_2H_4 \rightarrow C_2H_4O$	54.515	29.759	11.074	4.839	1.732	-7.567	85.266	*
84	$S + COS = S_2 + CO$	22.633	14.104	7.594	5.348	4.189	1.026	29.736	*
84	$S + S + M \rightarrow S_2 + M$	69.073	39.122	16.500	8.898	5.078	-6.138	103.328	*
85	$F + H_2 = HF + H$	23.191	13.886	6.885	4.546	3.376	-0.114	32.001	
85	$F + NH = HF + N$	37.234	22.061	10.657	6.841	4.927	-0.757	52.167	
85	$F + NH_2 = HF + NH$	31.464	18.923	9.523	6.370	4.780	0.092	43.073	
85	$F + NH_3 = HF + NH_2$	24.897	15.311	8.118	5.682	4.434	0.869	33.005	*
85	$F + OH = HF + O$	24.324	14.426	6.984	4.496	3.247	-0.461	34.034	
85	$F + H_2O = HF + OH$	12.692	7.836	4.209	2.988	2.367	0.558	16.658	
85	$F + Cl_2 = ClF + Cl$	1.582	0.965	0.494	0.341	0.267	0.032	2.129	
85	$F + HCl = HF + Cl$	23.703	14.080	6.868	4.461	3.253	-0.352	33.021	
85	$F + HNO = HF + NO$	63.075	37.954	19.081	12.747	9.557	0.161	86.396	*
85	$F + F_2O = F_2 + FO$	-0.239	0.107	0.295	0.326	0.331	0.470	-0.935	*
85	$F + CH_4 = HF + CH_3$	23.989	14.925	8.198	5.930	4.766	1.400	30.999	
86	$F + CF_3 = F_2 + CF_2$	-35.420	-20.857	-10.012	-6.454	-4.703	0.786	-49.648	*
86	$F + CF_4 = F_2 + CF_3$	-64.370	-37.646	-17.691	-11.096	-7.828	2.221	-91.355	*
87	$F + F + M = F_2 + M$	21.492	10.426	1.976	-0.894	-2.346	-6.483	38.479	*
88	$Cl + H_2 = HCl + H$	-0.512	-0.194	0.017	0.085	0.123	0.238	-1.020	

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
88	$Cl + Na_2 = NaCl + Na$	57.218	34.065	16.655	10.827	7.903	-0.770	79.630	
88	$Cl + O_3 = ClO + O_2$	29.731	18.407	9.840	6.933	5.460	1.235	39.167	*
88	$Cl + F_2 = ClF + F$	16.628	10.165	5.314	3.687	2.869	0.451	22.213	
89	$Cl + BrCl = Cl_2 + Br$	3.768	2.099	0.811	0.371	0.154	-0.473	5.839	
89	$Cl + Br_2 = BrCl + Br$	4.648	2.867	1.495	1.027	0.794	0.126	6.225	
89	$Cl + ClI = Cl_2 + I$	5.048	2.827	1.120	0.534	0.238	-0.591	7.763	
89	$Cl + HCl = Cl_2 + H$	-33.704	-20.496	-10.513	-7.145	-5.447	-0.508	-45.615	*
89	$Cl + NH = HCl + N$	13.531	7.981	3.789	2.380	1.674	-0.405	19.146	
89	$Cl + NH_2 = HCl + NH$	7.761	4.843	2.655	1.909	1.527	0.444	10.052	
89	$Cl + NH_3 = HCl + NH_2$	1.194	1.231	1.250	1.221	1.181	1.221	-0.016	
89	$Cl + N_2O = ClO + N_2$	19.460	12.359	6.953	5.084	4.117	1.488	24.731	*
89	$Cl + HNO = HCl + NO$	39.372	23.874	12.213	8.286	6.304	0.513	53.375	
89	$Cl + ClNO = Cl_2 + NO$	14.721	8.955	4.540	3.011	2.219	0.083	20.153	*
89	$Cl + ClO_2 = ClO + ClO$	5.647	4.025	2.757	2.294	2.046	1.456	5.790	*
89	$Cl + ClO_2 = Cl_2 + O_2$	39.583	23.859	11.989	7.980	5.954	0.080	54.278	*
89	$Cl + Cl_2O = Cl_2 + ClO$	19.608	12.083	6.349	4.392	3.399	0.592	26.156	*
89	$Cl + CClO = Cl_2 + CO$	28.840	17.059	8.130	5.102	3.569	-0.830	40.785	*
90	$Cl + CCl_2O = Cl_2 + CClO$	-4.232	-1.718	0.069	0.592	0.818	1.796	-8.206	*
90	$Cl + CH_4 = HCl + CH_3$	0.286	0.845	1.330	1.469	1.513	1.752	-2.022	
91	$Cl + CHF_3 = HCl + CF_3$	-0.926	0.038	0.755	0.954	1.024	1.415	-3.192	*
91	$Cl + CH_3Cl = Cl_2 + CH_3$	-18.423	-10.636	-4.759	-2.835	-1.901	1.051	-26.728	
92	$Cl + CHCl_3 = HCl + CCl_3$	6.532	4.420	2.814	2.230	1.908	1.148	7.423	*
92	$Cl + CCl_4 = Cl_2 + CCl_3$	-7.139	-3.395	-0.745	0.053	0.415	1.853	-12.250	*
92	$Cl + CClF_3 = Cl_2 + CF_3$	-18.345	-10.259	-4.330	-2.434	-1.523	1.544	-27.218	*
96	$Cl + Cl + M = Cl_2 + M$	36.538	19.626	6.796	2.452	0.256	-6.064	58.563	*

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
96	$Cl + Hg + M = ClHg + M$	13.899	6.629	1.080	-0.816	-1.782	-4.492	25.301	*
96	$Cl + CO \rightarrow CClO$	7.698	2.567	-1.334	-2.650	-3.313	-5.234	17.778	
96	$Cl + NO + M = ClNO + M$	21.817	10.671	2.256	-0.559	-1.963	-6.147	38.410	
97	$Cl + O_2 + M = ClO_2 + M$	-3.045	-4.233	-5.193	-5.528	-5.698	-6.144	4.285	
97	$Cl + CH_3 = CH_3Cl$	54.961	30.262	11.555	5.287	2.157	-7.115	85.291	*
97	$Cl + CCl_3 = CCl_4$	43.677	23.021	7.541	2.399	-0.159	-7.917	70.813	
100	$Br + H_2 = HBr + H$	-11.725	-6.873	-3.228	-2.000	-1.382	0.432	-16.697	
100	$Br + Na_2 = BrNa + Na$	49.184	29.289	14.355	9.363	6.856	-0.595	68.346	
100	$Br + Cl_2 = BrCl + Cl$	-3.768	-2.099	-0.811	-0.371	-0.154	0.473	-5.839	
100	$Br + BrCl = Br_2 + Cl$	-4.648	-2.867	-1.495	-1.027	-0.794	-0.126	-6.225	
100	$Br + HBr = Br_2 + H$	-30.906	-18.783	-9.574	-6.458	-4.890	-0.354	-42.001	*
100	$Br + CH_3 = HBr + CH_2$	-15.327	-8.969	-4.198	-2.611	-1.825	0.565	-21.814	
100	$Br + CH_4 = HBr + CH_3$	-10.928	-5.834	-1.915	-0.616	0.008	1.945	-17.699	*
102	$Br + CHF_3 = HBr + CF_3$	-12.140	-6.641	-2.490	-1.131	-0.481	1.609	-18.869	
102	$Br + CHCl_3 = HBr + CCl_3$	-4.682	-2.259	-0.431	0.145	0.403	1.341	-8.254	
105	$Br + Br = Br_2 + M$	28.122	14.660	4.490	1.054	-0.692	-5.716	46.500	*
106	$Br + Br + H_2 = HBr + HBr$	47.302	26.570	10.836	5.512	2.816	-4.931	71.804	*
109	$I + H_2 = HI + H$	-23.425	-13.848	-6.652	-4.229	-3.004	0.573	-32.959	
109	$I + I + H_2 = HI + HI$	23.904	12.620	3.988	1.054	-0.428	-4.649	39.280	*
109	$I + Cl_2 = ClI + Cl$	-5.048	-2.827	-1.120	-0.534	-0.238	0.591	-7.763	
109	$I + HI = I_2 + H$	-26.258	-15.958	-8.116	-5.455	-4.112	-0.261	-35.749	*
109	$I + INO = I_2 + NO$	11.943	7.318	3.804	2.602	1.987	0.267	16.059	
109	$I + CH_4 = HI + CH_3$	-22.627	-12.809	-5.339	-2.845	-1.614	2.086	-33.962	*
110	$I + CH_2O = HI + CHO$	-12.085	-6.552	-2.350	-0.958	-0.279	1.814	-19.093	
111	$I + CHF_3 = HI + CF_3$	-23.839	-13.616	-5.914	-3.360	-2.103	1.750	-35.131	

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
111	$I + CF_3I = I_2 + CF_3$	-11.006	-5.859	-2.116	-0.938	-0.383	1.578	-17.202	*
112	$I + I + M = I_2 + M$	21.071	10.510	2.524	-0.172	-1.536	-5.482	36.490	*
122	$CH + H_2 \rightarrow CH_3$	71.842	40.506	16.808	8.864	4.888	-6.865	108.133	*
122	$CH + CH \rightarrow C_2H_2$	158.799	91.770	41.448	24.697	16.337	-8.821	230.107	
122	$CH + CH_4 = C_2H_4 + H$	41.482	24.165	11.304	7.109	5.047	-1.486	58.899	*
122	$CH + NH_3 = CHN + H_2 + H$	37.700	24.236	14.449	11.307	9.763	4.688	45.156	**
125	$CH_3 + H_2 = CH_4 + H$	-0.798	-1.039	-1.313	-1.384	-1.390	-1.513	1.003	
125	$CH_3 + O_2 = CH_2O + OH$	38.795	23.325	11.679	7.783	5.834	0.034	53.230	
125	$CH_3 + O_2 = CHO + H_2O$	60.633	36.671	18.657	12.612	9.568	0.604	82.439	*
126	$CH_3 + Cl_2 = CH_3Cl + Cl$	18.423	10.636	4.759	2.835	1.901	-1.051	26.728	
126	$CH_3 + HCl = CH_4 + Cl$	-0.286	-0.845	-1.330	-1.469	-1.513	-1.752	2.022	
126	$CH_3 + HBr = CH_4 + Br$	10.928	5.834	1.915	0.616	-0.008	-1.945	17.699	*
126	$CH_3 + HI = CH_4 + I$	22.627	12.809	5.339	2.845	1.614	-2.086	33.962	*
126	$CH_3 + H_2O = CH_4 + OH$	-11.297	-7.089	-3.989	-2.942	-2.399	-0.842	-14.340	
127	$CH_3 + H_2S = CH_4 + HS$	8.698	4.812	1.831	0.832	0.341	-1.126	13.510	
127	$CH_3 + NH_3 = CH_4 + NH_2$	0.908	0.386	-0.080	-0.248	-0.332	-0.531	2.007	
135	$CH_3 + CHO = CH_4 + CO$	63.399	37.259	17.541	10.944	7.649	-2.158	90.043	*
135	$CH_3 + CH_2O = CH_4 + CHO$	10.541	6.257	2.989	1.887	1.335	-0.272	14.868	
139	$CH_3 + CHCl_3 = CH_4 + CCl_3$	6.246	3.575	1.484	0.761	0.395	-0.604	9.445	*
139	$CH_3 + CCl_4 = CH_3Cl + CCl_3$	11.284	7.241	4.014	2.888	2.316	0.803	14.478	*
140	$CH_3 + Cl_3HSi = CH_4 + Cl_3Si$	26.601	15.847	7.639	4.847	3.435	-0.584	37.392	*
180	$C_2H + CH_4 = C_2H_2 + CH_3$	5.245	3.243	1.898	1.499	1.311	0.553	6.365	*
183	$CF_2 + O_2 = CO + O + F + F$	-71.295	-37.825	-12.459	-3.924	0.367	12.904	-115.713	*
183	$CF_2 + F_2 = CF_3 + F$	35.420	20.857	10.012	6.454	4.703	-0.786	49.648	*
183	$CF_2 + CF_2 \rightarrow C_2F_4$	41.803	21.316	6.080	1.110	-1.311	-9.054	69.716	*

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
184	$CF_3 + F_2 = CF_4 + F$	64.370	37.646	17.691	11.096	7.828	-2.221	91.355	*
184	$CF_3 + Cl = CClF_3 + Cl$	36.614	20.072	7.728	3.660	1.651	-4.576	56.500	*
184	$CF_3 + Br_2 = CBrF_3 + Br$	15.038	8.266	3.299	1.716	0.964	-1.611	22.781	*
184	$CF_3 + I_2 = CF_3I + I$	11.006	5.859	2.116	0.938	0.383	-1.578	17.202	*
184	$CF_3 + HCl = CHF_3 + Cl$	0.926	-0.038	-0.755	-0.954	-1.024	-1.415	3.192	*
184	$CF_3 + HBr = CHF_3 + Br$	12.140	6.541	2.490	1.131	0.481	-1.609	18.869	
184	$CF_3 + HBr = CBrF_3 + H$	-15.868	-10.517	-6.275	-4.742	-3.926	-1.965	-19.220	*
184	$CF_3 + HI = CHF_3 + I$	23.839	13.616	5.914	3.360	2.103	-1.750	35.131	
184	$CF_3 + H_2S = CHF_3 + HS$	9.910	5.619	2.406	1.347	0.830	-0.790	14.679	
184	$CF_3 + CH_4 = CHF_3 + CH_3$	1.212	0.807	0.575	0.515	0.489	0.336	1.169	
189	$CF_3 + CHCl_3 = CHF_3 + CCl_3$	7.458	4.382	2.059	1.276	0.884	-0.268	10.615	
189	$CF_3 + CCl_4 = CClF_3 + CCl_3$	11.206	6.864	3.585	2.487	1.938	0.309	14.968	
193	$CF_3 + CF_3 \rightarrow C_2F_6$	59.892	31.855	11.031	4.213	0.863	-9.706	95.412	*
198	$CCl_3 + Cl_2 = CCl_4 + Cl$	7.139	3.395	0.745	-0.053	-0.415	-1.853	12.250	*
199	$CCl_3 + HCl = CHCl_3 + Cl$	-6.532	-4.420	-2.814	-2.230	-1.908	-1.148	-7.423	*
199	$CCl_3 + HCl = CCl_4 + H$	-26.565	-17.101	-9.768	-7.198	-5.862	-2.361	-33.365	*
199	$CCl_3 + HBr = CHCl_3 + Br$	4.682	2.259	0.431	-0.145	-0.403	-1.341	8.254	
206	$CCl_3 + CCl_3 \rightarrow C_2Cl_6$	40.833	20.488	5.483	0.637	-1.707	-9.409	68.807	**
206	$NH + NH = N_2 + H_2$	115.910	68.706	33.308	21.512	15.614	-2.088	161.979	
206	$NH + NH_3 = NH_2 + NH_2$	-6.567	-3.612	-1.405	-0.688	-0.346	0.777	-10.068	
206	$NH + O_2 = NO + OH$	36.792	22.248	11.332	7.680	5.849	0.402	49.963	
206	$NH + OH = NO + H_2$	48.972	28.892	13.852	8.858	6.367	-1.171	68.819	
206	$NH + OH = H_2O + N$	24.542	14.225	6.448	3.853	2.560	-1.314	35.509	
206	$NH + N_2O = HNO + N_2$	56.534	34.123	17.213	11.525	8.660	0.275	77.288	*
206	$NH + NO_2 = HNO + NO$	32.243	19.546	9.980	6.775	5.170	0.411	43.719	

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
206	$NH + HNO = NH_2 + NO$	31.611	19.031	9.558	6.377	4.777	0.069	43.323	
206	$NH + NH_3 = N_2H_4$	27.354	13.535	3.178	-0.204	-1.849	-7.081	47.233	*
206	$NH_2 + O_2 = HO_2 + NH$	-32.981	-19.589	-9.509	-6.137	-4.447	0.572	-46.078	
206	$NH_2 + NH_2 = NH_3 + NH$	6.567	3.612	1.405	0.688	0.346	-0.777	10.068	
206	$NH_2 + NH_2 = N_2H_2 + H_2$	19.213	10.694	4.374	2.327	1.334	-1.891	28.919	*
207	$NH_2 + HNO = NH_3 + NO$	38.178	22.643	10.963	7.065	5.123	-0.708	53.391	
207	$NH_2 + NH_2 \rightarrow N_2H_4$	33.921	17.147	4.583	0.484	-1.503	-7.858	57.302	*
207	$NF + NF = N_2 + F + F$	63.308	39.694	22.094	16.258	13.348	4.489	80.692	*
207	$NF_2 + F_2 = NF_3 + F$	14.779	8.203	3.379	1.838	1.098	-1.397	22.137	*
207	$NF_2 + M = NF + F + M$	-43.250	-23.300	-8.239	-3.193	-0.662	6.816	-68.774	*
208	$OH + H_2 = H_2O + H$	10.499	6.050	2.676	1.558	1.009	-0.671	15.343	
208	$OH + OH = H_2O + O$	11.632	6.590	2.775	1.508	0.880	-1.019	17.376	
208	$OH + OH = H_2 + O_2$	12.180	6.644	2.520	1.178	0.518	-1.573	18.855	
208	$OH + HO_2 = H_2O + O_2$	51.753	30.676	14.823	9.519	6.860	-1.038	72.493	
209	$OH + H_2O_2 = H_2O + HO_2$	21.669	12.963	6.324	4.064	2.925	-0.329	30.256	*
209	$OH + F_2 = HF + O$	13.578	9.213	5.996	4.943	4.420	2.780	14.795	
209	$OH + CO = CO_2 + H$	15.473	8.189	2.835	1.149	0.353	-2.428	24.490	*
210	$OH + CO_2 = HO_2 + CO$	-44.547	-26.171	-12.462	-7.932	-5.686	1.222	-62.785	*
210	$OH + CO_2 = O_2 + CHO$	-67.490	-39.843	-19.169	-12.299	-8.874	1.500	-94.675	
210	$OH + NO = HO_2 + N$	-64.003	-38.699	-19.707	-13.346	-10.149	-0.678	-86.948	
210	$OH + NO = NO_2 + H$	-23.155	-14.722	-8.324	-6.118	-4.984	-1.857	-29.295	*
210	$OH + HCl = H_2O + Cl$	11.011	6.244	2.659	1.473	0.886	-0.909	16.362	
210	$OH + HBr = H_2O + Br$	22.225	12.923	5.904	3.558	2.391	-1.103	32.039	
210	$OH + O_3 = HO_2 + O_2$	28.643	17.365	8.817	5.934	4.484	0.262	39.006	*
210	$OH + NH_2 = H_2O + NH$	18.772	11.087	5.314	3.382	2.413	-0.465	26.415	

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
210	$OH + NH_3 = H_2O + NH_2$	12.205	7.475	3.909	2.694	2.067	0.311	16.347	
210	$OH + HNO = H_2O + NO$	50.383	30.118	14.872	9.759	7.190	-0.396	69.738	
210	$OH + HNO = NO_2 + H_2$	16.729	9.346	3.872	2.083	1.197	-1.583	25.100	*
210	$OH + HNO_2 = H_2O + NO_2$	29.674	17.681	8.572	5.476	3.901	-0.572	41.588	*
210	$OH + HNO_3 = H_2O + NO_3$	12.795	7.479	3.448	2.075	1.369	-0.608	18.429	
211	$OH + CH_3 = CH_4 + O$	0.335	-0.499	-1.214	-1.434	-1.519	-1.861	3.036	
211	$OH + CH_4 = H_2O + CH_3$	11.297	7.089	3.989	2.942	2.399	0.842	14.340	
212	$OH + C_2H_2 = H_2O + C_2H$	6.052	3.846	2.091	1.443	1.088	0.290	7.975	*
212	$OH + CH_2O = H_2O + CHO$	21.838	13.346	6.978	4.829	3.734	0.570	29.208	
213	$OH + OH + M = H_2O_2 + M$	30.510	15.421	4.017	0.223	-1.669	-7.342	51.989	
213	$OH + NO$ -> HNO_2	28.424	13.963	3.072	-0.524	-2.296	-7.750	49.657	
213	$HS + CH_4 = H_2S + CH_3$	-8.698	-4.812	-1.831	-0.832	-0.341	1.126	-13.510	
213	$HS + CHF_3 = H_2S + CF_3$	-9.910	-5.619	-2.406	-1.347	-0.830	0.790	-14.679	
214	$HO_2 + H_2 = H_2O_2 + H$	-11.170	-6.913	-3.648	-2.506	-1.916	-0.342	-14.913	*
214	$HO_2 + N_2 = HNO + NO$	-28.776	-17.008	-8.173	-5.214	-3.728	0.677	-40.442	
214	$HO_2 + CO = CO_2 + OH$	44.547	26.171	12.462	7.932	5.686	-1.222	62.785	*
214	$HO_2 + NO = NO + OH_2$	5.919	3.260	1.303	0.665	0.349	-0.651	9.000	
214	$HO_2 + NO = HNO + O_2$	1.370	0.558	-0.049	-0.240	-0.330	-0.641	2.755	
214	$HO_2 + H_2O = H_2O_2 + OH$	-21.669	-12.963	-6.324	-4.064	-2.925	0.329	-30.256	*
214	$HO_2 + HO_2 = H_2O_2 + O_2$	30.084	17.713	8.499	5.455	3.935	-0.708	42.237	
214	$HO_2 + HNO = H_2O_2 + NO$	28.714	17.155	8.548	5.695	4.265	-0.067	39.482	
214	$HO_2 + CH_2O = H_2O_2 + CHO$	0.169	0.383	0.654	0.765	0.809	0.899	-1.048	*
221	$CHO + CHO = H_2 + CO + CO$	57.640	36.280	20.416	15.144	12.498	4.504	72.883	*
222	$CHO + M = H + CO + M$	-6.557	-2.018	1.562	2.816	3.459	5.149	-16.157	*
224	$ClO + H_2 = HCl + OH$	27.474	16.746	8.621	5.869	4.480	0.472	37.114	*

REF PAGE	REACTION	EQUILIBRIUM LOG10(KP) TEMPERATURE (K) 300	500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
224	$ClO + O_3 = ClO_2 + O_2$	24.084	14.382	7.083	4.639	3.414	-0.221	33.377	
224	$ClO + ClO = Cl_2 + O_2$	33.936	19.834	9.232	5.686	3.908	-1.376	48.489	
224	$ClO + ClO = ClO_2 + Cl$	-5.647	-4.025	-2.757	-2.294	-2.046	-1.456	-5.790	*
224	$ClO + Cl_2O = ClO_2 + Cl_2$	13.961	8.058	3.592	2.098	1.353	-0.864	20.366	
224	$ClO + Cl_2O = Cl + O_2 + Cl_2$	17.006	12.291	8.785	7.626	7.051	5.280	16.081	
225	$CClO + O_2 = CO_2 + ClO$	38.363	22.354	10.337	6.349	4.371	-1.648	54.920	
225	$CClO + Cl_2 = CCl_2O + Cl$	4.232	1.718	-0.069	-0.592	-0.818	-1.796	8.206	*
225	$CClO + ClNO = CCl_2O + NO$	18.953	10.673	4.471	2.419	1.401	-1.713	28.359	
225	$CClO \rightarrow CO + Cl$	-7.698	-2.567	1.334	2.650	3.313	5.234	-17.778	
226	$CN + H_2 = CHN + H$	13.404	7.594	3.473	2.129	1.493	-0.684	19.288	*
226	$CN + CN = C_2 + H_2$	4.918	2.721	1.175	0.680	0.437	-0.386	7.236	*
226	$CN + NO = N_2 + CO$	109.466	65.171	31.930	20.836	15.283	-1.321	152.097	
226	$CN + O_2 = CNO + O$	3.864	2.044	0.797	0.458	0.322	-0.394	5.769	*
226	$CN + O_2 = NO + CO$	79.320	47.605	23.806	15.862	11.885	-0.003	108.900	
226	$CN + CClN = C_2N_2 + Cl$	23.221	13.293	5.960	3.584	2.423	-1.328	33.629	*
227	$CN + H_2O = CHN + OH$	2.905	1.644	0.797	0.571	0.484	-0.013	3.945	*
227	$CN + NH_3 = CHN + NH_2$	15.110	9.119	4.706	3.265	2.551	0.298	20.292	*
227	$CN + CH_4 = CHN + CH_3$	14.202	8.733	4.786	3.513	2.883	0.829	18.285	*
227	$CN + C_2H_2 = CHN + C_2H$	8.957	5.490	2.888	2.014	1.572	0.277	11.920	
227	$CN + CN \rightarrow C_2N_2$	89.172	50.093	20.879	11.223	6.438	-8.260	133.677	*
228	$NO + H_2 = HNO + H$	-39.884	-24.068	-12.196	-8.201	-6.181	-0.275	-54.395	
228	$NO + NO = N_2 + O_2$	30.146	17.566	8.124	4.974	3.398	-1.319	43.197	
228	$NO + NO = N_2O + O$	-28.347	-17.837	-9.854	-7.122	-5.723	-1.815	-36.490	*
228	$NO + N_2O = NO_2 + N_2$	24.291	14.577	7.233	4.750	3.490	-0.136	33.570	*
228	$NO + NO_3 = NO_2 + NO_2$	17.451	10.792	5.694	3.939	3.037	0.562	23.246	*

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
228	$NO + HNO = N_2O + OH$	10.404	5.691	2.243	1.129	0.587	-1.192	15.872	*
228	$NO + ClNO_2 = ClNO + NO_2$	4.041	2.806	1.842	1.499	1.318	0.864	4.385	
228	$NO + CO_2 = NO_2 + CO$	-38.628	-22.911	-11.159	-7.267	-5.337	0.571	-53.785	
228	$NO + O_3 = NO_2 + O_2$	34.562	20.625	10.120	6.599	4.833	-0.389	48.006	
229	$NO + F_2 = FNO + F$	13.069	7.723	3.780	2.499	1.872	-0.145	18.101	*
229	$NO + Cl_2 = ClNO + Cl$	-14.721	-8.955	-4.540	-3.011	-2.219	-0.083	-20.153	*
229	$NO + ClO_2 = NO_2 + ClO$	10.478	6.243	3.037	1.960	1.419	-0.168	14.628	
229	$NO + NO + H_2 = HNO + HNO$	-9.014	-7.820	-7.100	-6.890	-6.782	-6.343	-3.593	*
230	$NO + NO + O_2 = NO_2 + NO_2$	12.264	4.228	-1.876	-3.902	-4.906	-7.936	27.752	
230	$NO + NO + Cl_2 = ClNO + ClNO$	7.096	1.716	-2.284	-3.570	-4.182	-6.230	18.257	*
230	$NO + NO + Br_2 = BrNO + BrNO$	1.960	-1.344	-3.810	-4.608	-4.994	-6.247	11.251	
230	$NO + NO_2 + H_2O = HNO_2 + HNO_2$	-1.250	-3.718	-5.500	-6.000	-6.197	-7.178	8.069	*
231	$NO + O_2 + NO_2 = NO_3 + NO_2$	-5.187	-6.564	-7.570	-7.841	-7.943	-8.498	4.506	*
231	$NO + O_2 \rightarrow NO_3$	-5.187	-6.564	-7.570	-7.841	-7.943	-8.498	4.506	*
231	$NO + NO = N + O + NO$	-104.550	-60.493	-27.273	-16.125	-10.525	5.974	-151.817	*
232	$NO_2 + H_2 = NO + H_2O$	33.654	20.772	11.000	7.676	5.993	1.186	44.638	*
232	$NO_2 + CO = NO + CO_2$	38.628	22.911	11.159	7.267	5.337	-0.571	53.785	
232	$NO_2 + F_2 = FNO_2 + F$	9.719	5.366	2.213	1.226	0.764	-0.897	14.504	*
232	$NO_2 + HCl = HNO_2 + Cl$	-18.663	-11.437	-5.913	-4.003	-3.015	-0.337	-25.226	*
232	$NO_2 + HBr = HNO_2 + Br$	-7.449	-4.758	-2.668	-1.918	-1.510	-0.530	-9.549	*
232	$NO_2 + NO_2 = NO_3 + NO$	-17.451	-10.792	-5.694	-3.939	-3.037	-0.562	-23.246	*
232	$NO_2 + NO_2 = NO + NO + O_2$	-12.264	-4.228	1.876	3.902	4.906	7.936	-27.752	
232	$NO_2 + O_3 = NO_3 + O_2$	17.111	9.833	4.426	2.660	1.796	-0.951	24.760	*
233	$NO_2 + O_2S = O_3S + NO$	6.184	3.300	1.197	0.527	0.205	-0.888	9.674	
233	$NO_2 + NH_3 = HNO_2 + NH_2$	-17.469	-10.206	-4.663	-2.782	-1.834	0.884	-25.241	*

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
233	$NO_2 + CH_4 = HNO_2 + CH_3$	-18.377	-10.592	-4.583	-2.534	-1.502	1.415	-27.248	*
233	$NO_2 + ClNO = ClNO_2 + NO$	-4.041	-2.806	-1.842	-1.499	-1.318	-0.864	-4.385	
234	$NO_2 + CHCl_3 = HNO_2 + CCl_3$	-12.131	-7.017	-3.099	-1.773	-1.107	0.811	-17.803	*
234	$NO_2 + NO_2 = N_2O_4$	0.773	-3.167	-5.941	-6.734	-7.061	-8.605	12.747	*
234	$NO_2 + NO_3 \rightarrow N_2O_5$	8.554	2.164	-2.388	-3.786	-4.435	-6.876	21.043	*
234	$NO_2 + O_2 = NO + O + O_2$	-46.466	-25.054	-8.869	-3.444	-0.725	7.303	-73.869	*
235	$NO_3 + CO = NO_2 + CO_2$	56.079	33.703	16.853	11.206	8.374	-0.009	77.031	*
235	$NO_3 + NO_3 = NO_2 + NO_2 + O_2$	22.638	17.356	13.264	11.780	10.980	9.060	18.740	*
235	$NO_3 + ClNO = ClNO_2 + NO_2$	13.410	7.986	3.852	2.440	1.719	-0.302	18.861	*
235	$NO_3 + N_2 = NO_2 + O + N_2$	-29.015	-14.262	-3.175	0.495	2.312	7.866	-50.623	
235	$NO_3 + NO_2 = NO + O_2 + NO_2$	5.187	6.564	7.570	7.841	7.943	8.498	-4.506	*
239	$H_2 + O_2 = OH + OH$	-12.180	-6.644	-2.520	-1.178	-0.518	1.573	-18.855	
239	$H_2 + F_2 = HF + HF$	95.644	57.662	29.086	19.498	14.678	0.462	130.721	*
239	$H_2 + Cl_2 = HCl + HCl$	33.192	20.302	10.530	7.230	5.570	0.746	44.595	*
239	$H_2 + I_2 = HI + HI$	2.833	2.110	1.464	1.226	1.108	0.834	2.790	*
239	$H_2 + CO_2 = OH + CHO$	-79.670	-46.487	-21.689	-13.477	-9.392	3.073	-113.530	*
239	$H_2 + C_2H_2 = C_2H_4$	24.481	12.178	2.643	-0.596	-2.212	-6.838	43.125	*
239	$H_2 + H = H + H + H$	-70.754	-40.316	-17.292	-9.512	-5.580	5.794	-105.197	*
240	$H_2 + H_2 = H + H + H_2$	-70.754	-40.316	-17.292	-9.512	-5.580	5.794	-105.197	*
240	$H_2 + H_2O = H + H + H_2O$	-70.754	-40.316	-17.292	-9.512	-5.580	5.794	-105.197	*
241	$N_2 + O_2 = NO + NO$	-30.146	-17.566	-8.124	-4.974	-3.398	1.319	-43.197	
241	$N_2 + N = N + N + N$	-158.578	-92.672	-43.056	-26.434	-18.092	6.595	-226.845	*
241	$N_2 + N_2 = N + N + N_2$	-158.578	-92.672	-43.056	-26.434	-18.092	6.595	-226.845	*
241	$N_2 + M = N + N + M$	-158.578	-92.672	-43.056	-26.434	-18.092	6.595	-226.845	*
241	$O_2 + OS = O_2S + O$	8.560	4.781	2.010	1.128	0.706	-0.730	12.711	*

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
241	$O_2 + HBr = HO_2 + Br$	-29.528	-17.753	-8.919	-5.961	-4.469	-0.065	-40.454	
241	$O_2 + CH_4 = HO_2 + CH_3$	-40.456	-23.587	-10.834	-6.577	-4.461	1.880	-58.153	*
241	$O_2 + CH_2O = H_2 + CO_2 + O$	9.208	7.363	6.278	6.008	5.890	5.187	5.376	*
242	$O_2 + M = O + O + M$	-80.668	-45.880	-19.614	-10.790	-6.356	6.671	-119.987	*
242	$O_3 + O_3 = O_2 + O_2 + O_2$	56.860	37.022	22.116	17.100	14.572	7.158	68.259	*
242	$O_3 + C_2H_4 = C_2H_4O + O_2$	42.611	25.330	12.325	7.994	5.840	-0.653	59.402	
243	$O_3 + N_2 = O_2 + O + N_2$	-11.904	-4.429	1.251	3.155	4.108	6.915	-25.864	
243	$O_3 + O_2 = O_2 + O + O_2$	-11.904	-4.429	1.251	3.155	4.108	6.915	-25.864	
243	$O_3 + O_3 = O_2 + O + O_3$	-11.904	-4.429	1.251	3.155	4.108	6.915	-25.864	
243	$F_2 + HI = F + HF + I$	25.124	17.308	11.561	9.669	8.726	5.797	26.481	*
243	$F_2 + HBr = F + HF + Br$	13.425	10.333	8.137	7.440	7.104	5.938	10.219	*
243	$F_2 + M = F + F + M$	-21.492	-10.426	-1.976	0.894	2.346	6.483	-38.479	*
243	$Cl_2 + O_3 = ClO + ClO_2$	-9.852	-5.452	-2.149	-1.047	-0.494	1.155	-15.112	
244	$Cl_2 + Cl = Cl + Cl + Cl$	-36.538	-19.626	-6.796	-2.452	-0.256	6.064	-58.563	*
244	$Cl_2 + M = Cl + Cl + M$	-36.538	-19.626	-6.796	-2.452	-0.256	6.064	-58.563	*
244	$Br_2 + M = Br + Br + M$	-28.122	-14.660	-4.490	-1.054	0.692	5.716	-46.500	*
245	$I_2 + M = I + I + M$	-21.071	-10.510	-2.524	0.172	1.536	5.482	-36.490	*
245	$HF + M = H + F + M$	-93.945	-54.202	-24.177	-14.058	-8.956	5.907	-137.199	*
246	$HI + HI = H_2 + I_2$	-2.833	-2.110	-1.464	-1.226	-1.108	-0.834	-2.790	*
247	$CO + O_2 = CO_2 + O$	4.426	2.085	0.414	-0.079	-0.294	-1.203	7.668	*
247	$CO + Cl_2 = CClO + Cl$	-28.840	-17.059	-8.130	-5.102	-3.569	0.830	-40.785	*
247	$CO_2 = CO + O$	-85.094	-47.965	-20.028	-10.711	-6.062	7.874	-127.655	*
248	$N_2O + N_2O = N_2 + N_2 + O_2$	36.318	24.926	16.342	13.402	11.886	7.663	39.387	*
248	$OS + O_3 = O_2S + O_2$	77.324	46.232	22.875	15.073	11.170	-0.486	106.834	
248	$OS + OS = O_2S + S$	4.043	1.865	0.289	-0.198	-0.424	-1.258	7.239	*

REF PAGE	REACTION	TEMPERATURE (K) 300	EQUILIBRIUM LOG10(KP) 500	1000	1500	2000	FIT OF A*EXP(1000*E/RT) LOG10(A)	E	
248	$O_2S + O_2S = O_3S + OS$	-36.578	-22.307	-11.558	-7.947	-6.132	-0.791	-49.155	
248	$O_3S + N_2 = O_2S + O + N_2$	-52.650	-28.354	-10.066	-3.971	-0.930	8.192	-83.543	
248	$COS + M = CO + S + M$	-46.440	-25.018	-8.906	-3.550	-0.889	7.164	-73.592	
248	$CS_2 = CS + S$	-60.924	-33.586	-13.048	-6.211	-2.806	7.460	-93.881	
249	$NH_3 + NH_3 = NH_2 + NH_2 + H_2$	-67.342	-37.466	-14.826	-7.240	-3.464	7.759	-103.189	*
249	N_2H_4 -> $NH_2 + NH_2$	-33.921	-17.147	-4.583	-0.484	1.503	7.858	-57.302	*
249	$H_2O + CO_2 = HO_2 + CHO$	-119.243	-70.519	-33.992	-21.818	-15.734	2.538	-167.168	
249	$H_2O + H_2O = H + OH + H_2O$	-81.253	-46.366	-19.968	-11.070	-6.589	6.465	-120.540	*
250	H_2O_2 -> $OH + OH$	-30.510	-15.421	-4.017	-0.223	1.669	7.342	-51.989	
250	$HNO + HNO = H_2O + N_2O$	60.787	35.809	17.115	10.888	7.777	-1.588	85.610	
250	$HNO + HNO = NO + NO + H_2$	9.014	7.820	7.100	6.890	6.782	6.343	3.593	*
250	$HNO + M = H + NO + M$	-30.870	-16.248	-5.096	-1.311	0.601	6.069	-50.802	*
250	$HNO_2 = OH + NO$	-28.424	-13.963	-3.072	0.524	2.296	7.750	-49.657	
250	$HNO_3 + M = OH + NO_2 + M$	-27.852	-13.373	-2.502	1.062	2.801	8.277	-49.570	*
250	$ClNO + ClNO = NO + NO + Cl_2$	-7.096	-1.716	2.284	3.570	4.182	6.230	-18.257	*
250	$BrNO + BrNO = NO + NO + Br_2$	-1.960	1.344	3.810	4.608	4.994	6.247	-11.251	
251	$INO + INO = NO + NO + I_2$	2.815	4.126	5.084	5.376	5.510	6.015	-4.372	
252	$CF_4 + M = CF_3 + F + M$	-85.862	-48.072	-19.667	-10.202	-5.482	8.704	-129.834	
253	$CF_3I + M = CF_3 + I + M$	-32.077	-16.369	-4.640	-0.766	1.153	7.061	-53.691	
253	$C_2F_6 + M = CF_3 + CF_3 + M$	-59.892	-31.855	-11.031	-4.213	-0.863	9.706	-95.412	*
253	$C_2N_2 + M = CN + CN + M$	-89.172	-50.093	-20.879	-11.223	-6.438	8.260	-133.677	*
253	$CClN + M = CN + Cl + M$	-65.951	-36.800	-14.919	-7.639	-4.015	6.932	-100.049	

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PROGRAMS CONCERNED WITH THE COLLECTION AND EVALUATION OF CHEMICAL KINETIC DATA

1. CODATA: The Committee on Data for Science and Technology. This organization was created by the International Council of Scientific Unions. The executive Director is Dr. Christoph Schäfer, Westendstrasse 19, 6 Frankfurt/Main, Germany. A Task Group on Kinetics was established in 1970, headed by Dr. S.W. Benson, Stanford Research Institute, Menlo Park, California 94025.

2. National Academy of Sciences, U.S. National Committee for the Committee on Data for Science and Technology of the International Council of Scientific Unions, F.D. Rossini, Chairman; Ad Hoc Committee on Chemical Kinetics, S.W. Benson.

3. (U.K.) Office of Scientific and Technical Information. Department of Education and Science, London.

4. (USSR) Commission on Compilation of Rate Coefficients. Organized February, 1970, by Prof. V.N. Kondratiev. A relevant bulletin will be published annually or biennially. Eleven Working Groups have been established: 1) Exchange, combination, and disintegration reactions of simple molecules (Chairman: A.I. Porojkova); 2) Monomolecular reactions (V.I. Vedeneev); 3) Reactions of radioactively contaminated particles (G.V. Karachevtsev); 4) Homolytic liquid-phase reactions (E.T. Denisov); 5) Heterolytic reactions (M.I. Vinnik); 6) Topochemical reactions (O.V. Krylov); 7) Reactions of solid inorganic compounds; 8) Reactions of solid organic compounds (Ya.S. Lebedev); 9) Polymerization reactions (A.A. Berlin); 10) Energy exchange processes (A.M. Tchaijkin); 11) Theoretical group (E.E. Nikitin).

5. (U.S.) National Standard Reference Data System (NSRDS). National Bureau of Standards. The program of the Office of Standard Reference Data (OSRD) in the area of chemical kinetics and radiation chemistry has followed the guidelines proposed by the National Academy of Sciences-National Research Council Advisory Panel in Chemical Kinetics. As implemented this is (1) to commission expert critical reviews of data, and (2) to provide data and information centers for these fields. The centers are the Atomic Collisions Information Center, the Chemical Kinetics Information Center, the Radiation Chemistry Data Center, and the Atomic and Molecular Processes Center, each of which is described separately.

6. Atomic Collisions Information Center, Joint Institute for Laboratory Astrophysics, University of Colorado, Boulder, Colorado, U.S.A. Dr. L.J. Kieffer, Director. Collects, evaluates and compiles data on collisions of electrons and photons with ions, atoms and molecules. The center is part of the U.S. National Standard Reference Data System.

7. Chemical Kinetics Information Center, National Bureau of Standards, Washington, D.C., U.S.A. Dr. David Garvin, Director. Collects and indexes published reactions in the gaseous, liquid and solid phases, photochemistry and inelastic scattering. It is part of the U.S. National Standard Reference Data System. Prepares bibliographies for authors of reviews in the NSRDS Critical review series and for the scientific public, both on request and on its own initiative. Evaluations of rate data and tables of data occasionally issued.

8. Radiation Chemistry Data Center, Radiation Laboratory, University of Notre Dame, Notre Dame, Indiana, U.S.A. Prof. Milton Burton, Director; Dr. Alberta Ross, Supervisor.

9. Atomic and Molecular Processes Information Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee. Dr. C.F. Barnett, Director. Directory of Federally Supported Information Analysis Centers (Committee on Scientific and Technical Information, Washington, D.C.). Atomic collision processes and molecular interactions for molecules consisting of less than five or six atoms. Issues bibliographies. Sponsors preparation of critical monographs. Supported by the U.S. Atomic Energy Commission and the Office of Standard Reference Data.

10. JANNAF Committee on Thermodynamics and Chemical Kinetics (formerly ICRPG Thermochemistry Working Group), J. Massey, Chairman. AFOSR, Washington, D.C.

11. Landolt-Bornstein Tabellen, Technische Hochschule, Institut für Technische Physik, 61 Darmstadt, Germany. Dr. K.-H. Hellwege, General Editor.

12. Tables de Constantes Selectionnées, 250 Rue St. Jacques, Paris V^{e}, France. Dr. P. Khodadd, Director.

13. High-Temperature Reaction Rate Data Centre, Advisory Panel Chairman, Prof. J.W. Linnett, Univ. of Cambridge, Cambridge, England. Dr. D.L. Baulch, Director, Department of Physical Chemistry, Leeds University, Leeds, England. Evaluates rate data for gas phase reactions that are of importance at high temperature. Publishes results as "High-Temperature Reaction Rate Data Reports" Nos. 1-5 issued as of June, 1970.

14. Tables of Bimolecular Gas Reactions. A.F. Trotman-Dickenson. This project continues the compilation and publication of rate data, the first product of which was "Tables of Bimolecular Gas Reactions" by A.F. Trotman-Dickenson and G.S. Milne, NSRDS-NBS-9. A supplement, supported by the UK OSTI has appeared. Future work will probably be undertaken by Dr. J.A. Kerr, Univ. of Wales, Institute for Science and Technology, Cardiff, Wales.

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